

FLORA OF WEST TROPICAL AFRICA

THE BRITISH WEST AFRICAN COLONIES,
BRITISH CAMEROONS, THE FRENCH AND
PORTUGUESE COLONIES SOUTH OF THE
TROPIC OF CANCER TO LAKE CHAD, AND
FERNANDO PO.

BY

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ANGIOSPERMAE

MONOCOTYLEDONES

(By J. HUTCHINSON ; *Orchidaceae* by V. S. SUMMERHAYES, B.Sc.)

REVISED ARTIFICIAL KEY TO THE FAMILIES OF MONOCOTYLEDONES REPRESENTED IN THIS FLORA ¹

(Extracted and adapted from Hutchinson, *The Families of Flowering Plants*
II. *Monocotyledons*)

KEY TO THE ARTIFICIAL GROUPS OF MONOCOTYLEDONES

Ovary completely superior :

Perianth present, or if small or very reduced or modified, or absent, then flowers not accompanied by glumaceous bracts or bracteoles (glumes) :

Carpels free or only slightly united at the base, or gynoeceium reduced to 1 carpel with 1 stigma ; mostly aquatic, sometimes marine plants Group 1 (p. 293)

Carpels more or less completely united, with usually more than 1 stigma ; rarely aquatic :

Perianth composed of separate calyx and corolla, the former often green, the latter usually petaloid, sometimes both series dry and hyaline, but never united into 1 tube Group 2 (p. 294)

Perianth composed of similar or subsimilar segments in 2 or 1 series, usually very conspicuous and petaloid, if united then connate in the lower part into a single tube, sometimes (when inflorescence a spadix) very small and inconspicuous Group 3 (p. 294)

Perianth sepaloid or dry and glumaceous, usually very small ; flowers mostly small and inconspicuous, and arranged in spadices or panicles, and often subtended by large spathaceous bracts ; or plants grass-like or sedge-like with very small flowers Group 4 (p. 295)

Perianth absent or represented by "hypogynous setae" or "scales" or "lodicules," with the flowers minute, arranged in spikelets and in the axils of scaly bracts (glumes) Group 5 (p. 295)

Ovary semi-inferior Group 6 (p. 295)

Ovary completely inferior :

Perianth composed of separate calyx and corolla, remaining in 2 distinct series, the calyx often green or different from the inner petaloid series Group 7 (p. 295)

Perianth-segments more or less all alike and usually petaloid, mostly 6, sometimes 3, free or often united at the base into a single tube Group 8 (p. 295)

GROUP 1.—Ovary superior ; perianth present, or if small or modified or absent, then flowers not accompanied by glumaceous bracts or bracteoles (glumes) ; carpels free or only 1 carpel with 1 stigma.

Flowers bracteate :

Ovules spread all over the inner surface of the carpels or intruding septa ; carpels dehiscent ; flowers umbellate ; leaves radical *Butomaceae* (p. 298)

Ovules inserted on a placenta or at the base or apex of the carpels :

Herbs with green leaves ; not saprophytic ; mostly aquatic or semi-aquatic *Alismataceae* (p. 301)

Saprophytic herbs with very reduced scale-like colourless leaves ; flowers unisexual or polygamous *Triuridaceae* (p. 304)

Tall palms ; leaves plicate in bud *Palmae* (p. 386)

¹ This revised key replaces that in Vol. I., pp. 40-42. It is necessary on account of the new classification proposed in Part 2 of Hutchinson's *Families of Flowering Plants* (Macmillan & Co.), published in 1934, after which this work is arranged.

Flowers without bracts (sometimes the single perianth-segment somewhat bract-like):

Fresh-water aquatics:

Flowers in racemes or spikes:

Flowers on one side of the inflorescence; perianth-segments 3-1 or absent, sometimes bract-like *Aponogetonaceae* (p. 305)

Flowers all round the axis of the inflorescence; stamens 4; anthers subsessile; carpels 4 *Potamogetonaceae* (p. 306)

Flowers axillary, solitary or in small cymes; stamens often solitary:

Carpels 2 or more; ovule pendulous *Zannichelliaceae* (p. 307)

Carpel solitary; ovule basal *Najadaceae* (p. 308)

Flowers minute, 1-3 in a membranous spathe; floating plants, with minute cellular green frond-like plant-body *Lemnaceae* (p. 366)

Marine or salt-marsh plants:

Flowers spicate, spikes terminal, at first enclosed by the sheathing base of the leaves *Ruppiceae* (p. 307)

Flowers axillary; male flowers long-pedunculate *Zannichelliaceae* (p. 307)

GROUP 2.—Ovary superior, syncarpous; perianth of separate calyx and corolla, the former often green, the latter usually petaloid, sometimes both series dry and hyaline but not united into one tube.

Flowers usually in cymes, panicles, racemes or spikes, or rarely solitary, but not capitate and without an involucre of bracts, sometimes enclosed by large leafy boat-shaped bracts or coloured leaves:

Leaves plicate in bud; usually tall palms with large panicles of small flowers with large spathaceous bracts *Palmae* (p. 386)

Leaves not plicate:

Perianth of calyx and petaloid corolla; leaves never cirrhose at the tip; fruit usually a capsule; seeds with a small "stopper" (embryostega); flowers sometimes within foliaceous bracts *Commelinaceae* (p. 308)

Perianth dry or somewhat petaloid, small; leaves often cirrhose at the tip; fruit indehiscent; seeds without a "stopper" *Flagellariaceae* (p. 320)

Flowers in heads and very small, surrounded by 2 or more involucral bracts; perianth hyaline:

Flowers hermaphrodite; ovules parietal or ascending from the base

Xyridaceae (p. 321)

Flowers unisexual monoecious; ovule solitary, pendulous *Eriocaulaceae* (p. 324)

GROUP 3.—Ovary completely superior, syncarpous; perianth of similar or subsimilar segments, if united then connate in the lower part into a single tube, sometimes (when inflorescence a spadix) very small and inconspicuous.

Flowers arranged in a scapose umbel subtended by more or less membranous spathaceous bracts; rootstock usually a bulb; leaves radical and mostly linear

Amaryllidaceae (p. 368)

Flowers not in umbels or if subumbellate then bracts not spathaceous:

Flowers in a spadix subtended by or enclosed in a spathe, very small and inconspicuous and often unisexual. *Araceae* (p. 356)

Flowers not in a spadix:

Aquatic herbs; inflorescence subtended by a spathe-like leaf-sheath; seeds ribbed; floral bracts absent or small *Pontederiaceae* (p. 354)

Terrestrial or marsh-plants; inflorescence not as above; bracts rarely absent:

Anthers 2-celled; flowers mostly bisexual; leaves mostly with parallel nerves and veins:

Anthers opening by slits or rarely by pores; ovary completely superior; rootstock a rhizome or bulb, rarely a corm:

Flowers usually bracteate; fruit a capsule or berry:

Plants not or only slightly xerophytic; leaves not fibrous; style usually divided; ovules usually numerous; fruit mostly a capsule *Liliaceae* (p. 338)

Plants usually xerophytic, or, if not, then ovule solitary and fruit a berry *Agavaceae* (p. 382)

Flowers mostly ebracteate; fruit drupaceous; leaf-tips cirrhose

Flagellariaceae (p. 320)

Anthers opening by pores; ovary partly inferior; rootstock a corm or flattened tuber *Tecophilaeaceae* (p. 352)

Anthers 1-celled by confluence of the cells; flowers small, mostly dioecious; stems climbing or straggling, often prickly; leaves 3-5-nerved, with reticulate venation

Smilacaceae (p. 355)

GROUP 4.—*Ovary completely superior, syncarpous; perianth sepeloid or dry and glumaceous, usually very small or rarely absent; flowers often in spadices or panicles or heads; plants may be grass-like or sedge-like.*

Leaves plicate in bud, with strong parallel nerves, either pinnately or flabellately divided or nerved *Palmae* (p. 386)

Leaves not plicate in bud; not palms:

Grass-like herbs; leaves linear or setaceous; flowers in a cluster *Juncaceae* (p. 463)

Not grass-like, or, if so, then inflorescence a dense spike:

Flowers hermaphrodite or if unisexual then monoecious:

Terrestrial or very rarely (*Pistia*) aquatic and then with well-developed leaves

.. .. . *Araceae* (p. 356)

Aquatic plants, floating; plant-body and flowers minute *Lemnaceae* (p. 366)

Flowers dioecious or very rarely monoecious; floral bracts absent:

Herbaceous aquatics; leaves without prickles; flowers in dense spikes

.. .. . *Typhaceae* (p. 366)

Shrubs or trees; margins of the spirally arranged leaves often prickly; aerial roots often present *Pandanaceae* (p. 392)

GROUP 5.—*Ovary superior; perianth absent or represented by "hypogynous setae" or "scales" or "lodicules"; flowers minute, generally in spikelets and in the axil of a scaly bract; sedges and grasses.*

Flowers in the axil of a single bract and collected into spikelets; leaves usually with closed sheaths; stem mostly solid and triquetrous; embryo free from the pericarp *Cyperaceae* (p. 464)

Flowers enclosed by a bract and bracteole (*lemma* and *palea*), arranged in spikelets; leaves usually with open sheaths; stems mostly with hollow internodes and usually terete; embryo usually adnate to the pericarp *Gramineae* (p. 495)

GROUP 6.—*Ovary semi-inferior.*

Perianth deciduous, circumscissile at the base *Tecophilaeaceae* (p. 352)

GROUP 7.—*Ovary completely inferior, syncarpous; perianth of separate calyx and corolla, remaining in two distinct series, the calyx often green or different from the inner petaloid series.*

Inner perianth actinomorphic:

Stamens 3 or more; no petaloid staminodes:

Aquatic; ovules spread all over the inner surface of the carpel or rarely superposed in 2 series; flowers mostly unisexual, solitary or the males several within a folded bract or bracts; outer perianth valvate; no endosperm *Hydrocharitaceae* (p. 298)

Terrestrial or epiphytic; ovules confined to placentas:

Calyx actinomorphic; flowers hermaphrodite *Iridaceae* (p. 374)

Calyx tubular, soon split down one side, 3-5-dentate at the apex; flowers unisexual; bananas *Musaceae* (p. 328)

Stamen 1, the remainder transformed into petaloid staminodes often more conspicuous than the real perianth:

Anthers 2-celled; sepals united *Zingiberaceae* (p. 329)

Anthers 1-celled; sepals free or at most connivent:

Ovules numerous in each cell; embryo straight *Cannaceae* (p. 335)

Ovule solitary in each cell; embryo much curved *Marantaceae* (p. 335)

Inner perianth zygomorphic:

Stamens 6 or 5:

Ovary not spirally twisted; pollen granular; seeds with endosperm

.. .. . *Musaceae* (p. 328)

Ovary spirally twisted; seeds without endosperm; 3 stamens on a column and 2 at the base *Orchidaceae* (p. 400)

Stamens 3; ovary not twisted; pollen granular; seeds with endosperm

.. .. . *Iridaceae* (p. 374)

Stamens 2 or 1, inserted on a prolongation of the axis (column), with often the pollen agglutinated into masses; ovary often spirally twisted; seeds very numerous and minute, without endosperm; one of the petals (lip) different from the others

.. .. . *Orchidaceae* (p. 400)

GROUP 8.—*Ovary completely inferior, syncarpous; perianth-segments usually petaloid, mostly 6, sometimes 3, free or often united at the base into a single tube.*

Ovules spread all over the inner walls of the carpels or on intrusive septa; flowers in spathaceous bracts; no endosperm *Hydrocharitaceae* (p. 298)

Ovules borne on placentas or at the base or apex of the ovary :

Inflorescence scapose, umbellate, subtended by an involucre of one or more spathaceous bracts :

Perianth actinomorphic ; ovary not twisted ; stamens 6 ; seeds with endosperm
Amaryllidaceae (p. 368)

Perianth zygomorphic ; ovary usually twisted ; stamens 2 or 1 ; seeds without
endosperm *Orchidaceae* (p. 400)

Inflorescence not as above, or if appearing umbellate then not subtended by an involucre of spathaceous bracts :

Small saprophytic herbs, usually with much reduced scale-like colourless leaves :

Stamens 6 or 5 ; ovary not twisted :

Perianth-tube cylindric, shortly lobed ; lobes not appendaged ; stamens 3 ; ovary
and fruit winged *Burmanniaceae* (p. 396)

Perianth-tube inflated or campanulate, with filiform or appendaged lobes ; stamens
usually 6 *Thismiaceae* (p. 399)

Stamen 1 ; perianth zygomorphic ; ovary usually twisted .. *Orchidaceae* (p. 400)

Not saprophytic :

Stamens 6 or more ; perianth zygomorphic ; pollen granular :

Fruit a capsule :

Stems leafy ; flowers unisexual, usually very small and inconspicuous ; seeds
mostly winged ; usually climbers with tuberous roots ; yams

Dioscoreaceae (p. 379)

Stems with a tuft of leaves ; flowers hermaphrodite ; inflorescence scapose ;
ovary sometimes long-beaked and resembling a narrow tube

Hypoxidaceae (p. 394)

Fruit a berry or indehiscent :

Herbs (not climbing) :

Leaves entire, linear, with parallel nerves *Hypoxidaceae* (p. 394)

Leaves often much divided ; flowers subumbellate .. *Taccaceae* (p. 396)

Climbers ; leaves often broad, and with reticulate venation, sometimes deeply
divided *Dioscoreaceae* (p. 379)

Stamens 3 ; perianth rarely zygomorphic ; pollen granular :

Climbers, with usually broad sometimes compound leaves and small inconspicuous
flowers *Dioscoreaceae* (p. 379)

Herbs, with rhizomes, corms or rarely bulbs *Iridaceae* (p. 374)

Stamen 1 ; pollen often agglutinated ; ovary often twisted ; perianth strongly
zygomorphic *Orchidaceae* (p. 400)

PHYLOGENETIC SEQUENCE OF ORDERS (COHORTS) AND FAMILIES CONTAINED IN VOLUME II. PART II.

(The cross-lines show breaks in affinity.)

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MONOCOTYLEDONES

146. BUTOMACEAE

Perennial, aquatic or swamp rhizomatous herbs, usually with milky juice. Leaves ensiform to orbicular. Flowers solitary or umbellate. Perianth 2-seriate, the outer 3 usually sepal-like, imbricate, the inner 3 petal-like and usually thin and deciduous. Stamens hypogynous, 8-9 or numerous; anthers basifixed, opening laterally. Carpels free; ovules numerous, scattered on the reticulately branched parietal placentas. Fruits opening by the adaxial suture. Seeds numerous, without endosperm.

Temperate and tropical regions; distinguished from all other Monocotyledons by the peculiar placentation of the ovules, probably a primitive characteristic.

TENAGOCHARIS Hochst. in Flora 24 : 369 (1841).

(*Butomopsis* Kunth—F.T.A. 8 : 214.)

Scapigerous marsh herbs with milky juice; leaves radical, petiolate. Flowers umbellate, with membranous bracts. Sepals 3, persistent. Petals 3, smaller than sepals, fugacious. Stamens 9, in 2 whorls. Carpels about 6; ovules numerous.

Rootstock small, with slender fibrous roots; leaves all radical, long-petiolate, oblanceolate, shortly and subobtusely acuminate, gradually narrowed to the base, about 10 cm. long and 3 cm. broad, glabrous, with 2 pairs of ascending parallel nerves, faintly reticulate between the nerves; umbels long-pedunculate, about 3-8-flowered; pedicels up to 11 cm. long in fruit; sepals ovate, about 1 cm. long in fruit, thin with membranous margins; petals shorter than the sepals; stamens usually 9; carpels usually 6, overtopping the calyx in fruit; seeds minute *latifolia*

T. latifolia Buchenau Index Crit. in Abh. Nat. Ver. Bremen 2 : 1 and 5. *Butomus latifolius* D. Don. *B. lanceolatus* Roxb. *Butomopsis lanceolata* Kunth—F.T.A. 8 : 214; Chev. Bot. 687. *Tenagocharis lanceolata* Dur. and Schinz.

French Sudan: Niakunké (Apr.)! Senegal: Kaédi (Dec.)! Casamance! N. Nigeria: Nupe! Extends through the Chad area to Eastern Sudan, N. India and N. Australia. Exsicc.—Roger 69. Heudelot 126. Barter 1509. Roegge 118.

147. HYDROCHARITACEAE

Fresh-water or salt-water herbs, partly or wholly submerged; roots sometimes floating. Leaves radical or cauline, alternate to whorled. Flowers hermaphrodite or unisexual, arranged in a bifid spathaceous bract or within two opposite bracts, females solitary; peduncle sometimes spirally twisted. Perianth-segments free, 1-2-seriate, 3 in each or rarely 2, the outer often green, valvate, the inner imbricate and petaloid. Stamens numerous to 3. Male flowers with rudimentary ovary. Staminodes usually present in the female flower. Ovary inferior, 1-celled, with parietal placentas sometimes protruding nearly to the middle of the ovary. Ovules numerous. Fruit rupturing irregularly. Seeds numerous, without endosperm.

Warmer regions of the world; advanced relatives of the preceding family, but with the ovary inferior.

Perianth-segments 6, in two series; spathes winged; flowers remaining in the spathes; peduncle not spirally coiled in fruit 1. *Ottelia*

Perianth-segments 6, in two series; spathes not winged; flowers exserted from the spathes; peduncle filiform, not spirally coiled in fruit 2. *Blyxa*

Perianth-segments 3, in one series; spathes not winged; male flowers freed from the spathes when mature; fruiting peduncle spirally coiled, the fruit developing below the surface of the water 3. *Vallisneria*

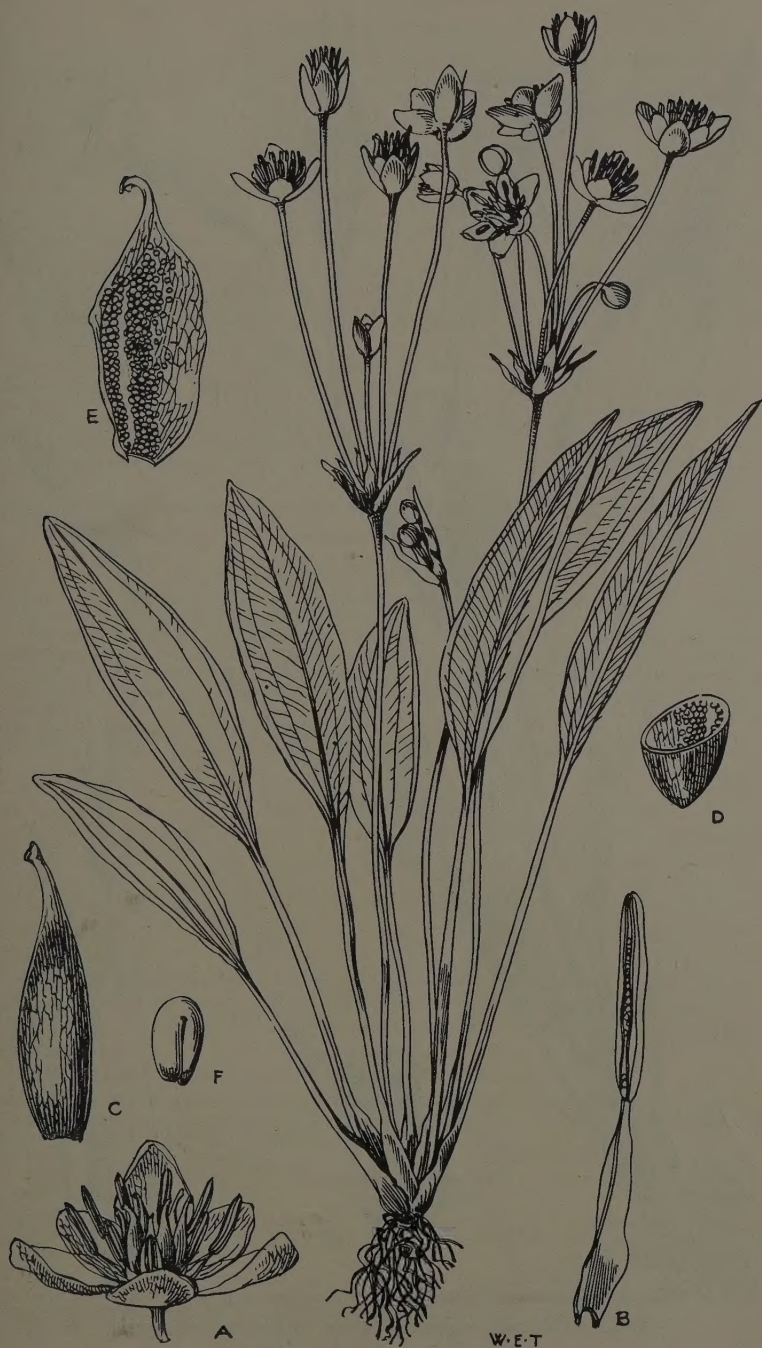


FIG. 278.—*TENAGOCHARIS LATIFOLIA* Buchenau (BUTOMACEAE).

A, flower. B, stamen. C, carpel. D, cross-section of carpel. E, carpel opened out. F, ovule.

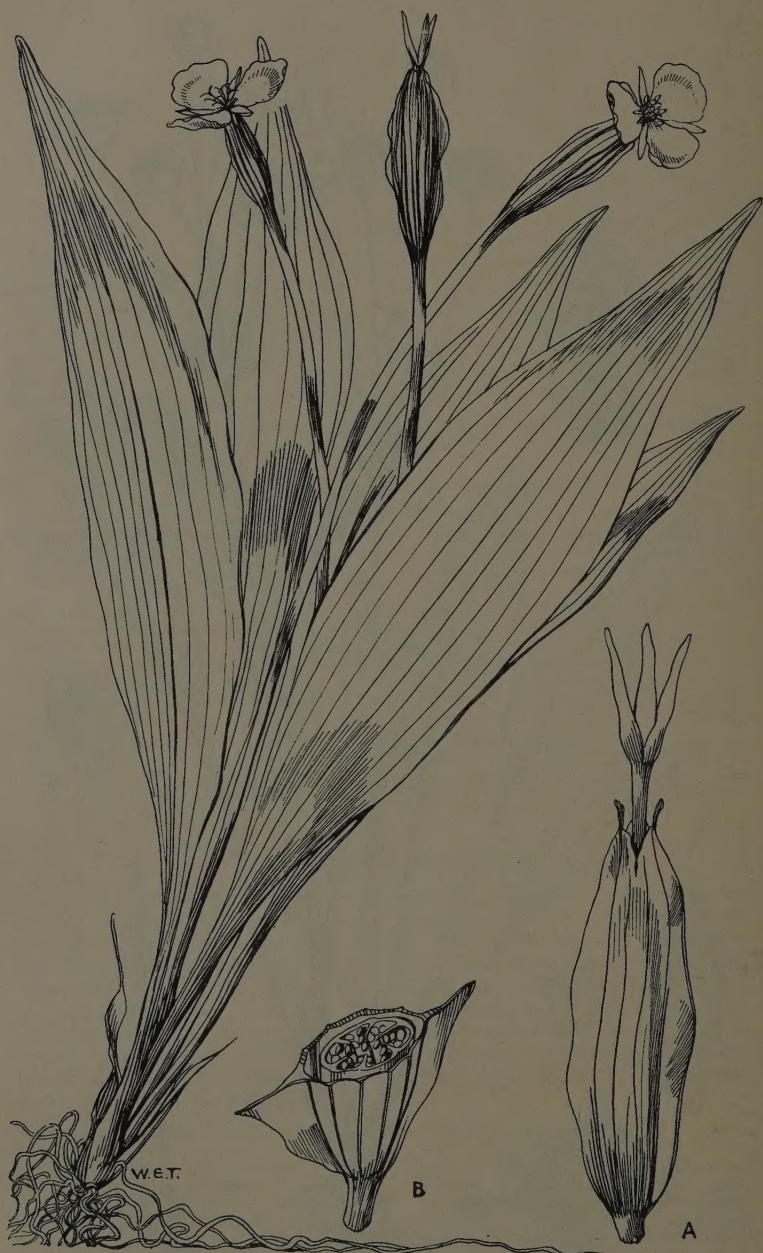


FIG. 279.—*OTTELIA ULVIFOLIA* Walp. (HYDROCHARITACEAE).
A, fruit. B, cross-section of fruit.

1. OTTELIA Pers.—F.T.A. 7: 6.

Roots numerous, slender, yellowish-brown when dry; leaves oblanceolate, subacute, gradually narrowed into the wing-like petiole, averaging about 30 cm. long and 6 cm. broad, often much smaller, glabrous, very thin; spathe compressed, narrowly oblong-elliptic, 2-winged, shortly lobed, 2-5.5 cm. long, faintly nerved; beak of the ovary not or only shortly exerted from the spathe, narrow; outer perianth-segments oblong-lanceolate, up to about 2 cm. long, green, inner segments rich yellow or white, about twice as long as the outer; fruit about as long as and enclosed in the somewhat expanded spathe *ulvifolia*

O. ulvifolia ¹ Walp. Ann. 3: 510. *Damasonium ulvaeifolium* Planch. *O. lanceifolia* A. Rich.—F.T.A. 7: 7; var. *fluitans* Ridl.—Chev. Bot. 612. *O. vesiculata* Ridl.—F.T.A. 7: 7. *O. plantaginea* Weiw.—F.T.A. 7: 7. *O. abyssinica* Gürke. *Boottia abyssinica* Ridl.—F.T.A. 7: 9, partly. Leaves submerged; flowers usually floating, yellow or white.

French Guinea: Lake Tété (Apr.)! Farana (Jan.)! Sierra Leone: Gbinti (July)! Masactaba (Oct.)! Gbegwema (Nov.)! Dam Bo (May)! Binkolo (Aug.)! Ivory Coast: Upper Sassandra! N. Nigeria: various localities! In tropical Africa generally, Transvaal, and in Madagascar. Exsicc.—*Deighton* 398; 1967. *Glanville* 5. *Lane-Poole* 249. *Thomas* 1670. *Dalz.* 226; 227; 859. *Barter* 910. *Lely* 509. *Elliot* 141. *Ryff.* Chev. 20456; 21542. *Leclercq* in Herb. Chev. 42457. *Linder* 474. (See Appendix).

2. BLYXA Thouars.—F.T.A. 7: 6.

Leaves in a rosette, submerged, narrowly lanceolate, ending in a very sharp point, about 3 cm. long and 0.5 cm. broad, prominently 3-nerved, shortly setulose on the nerves below and on the margin; male spathes pedunculate, about 2 cm. long; peduncle at length elongated and filiform; male flowers on filiform pedicels; female spathes 3 cm. long in fruit; seeds flattened, lanceolate, acute, with jagged-dentate wings *senegalensis*

B. senegalensis *Dandy* in Journ. Bot. 1934: 42. A submerged aquatic with a rosette of about a dozen sharply pointed leaves.

Senegal: near Tambacounda; lakes on laterite plateau (Nov.)! Exsicc.—*Chev.* 34005; 34016; 34018.

3. VALLISNERIA Linn.—F.T.A. 7: 5.

Submerged; leaves elongated, linear, entire or denticulate, up to about 30 cm. long or more and about 6 mm. broad, glabrous; spathes dioecious; male spathes several-flowered, female 1-flowered; male flowers becoming detached from the axis and floating in the water, where pollination is affected with the single female flower, which after fertilization is drawn down by the spirally coiling peduncle; perianth 3-lobed; stamens 3; ovary 1-celled with 3 parietal placentas; capsule about 5 cm. long *spiralis*

V. spiralis ¹ *Linn.*—F.T.A. 7: 5; *Holl.* 653.

Nigeria: Lagos, in lagoons! Warmer regions of the world. Exsicc.—*Barter* 20163.

148. ALISMATACEAE

Perennial or annual marsh or aquatic herbs. Leaves basal, with elongated petioles sheathing at the base and linear-lanceolate to ovate-rounded often sagittate blades, nerves parallel and converging at the apex, the transverse nerves often close and parallel. Flowers often whorled in racemes or panicles, rarely solitary, usually hermaphrodite. Perianth 2-seriate, the outer 3 imbricate, persistent, green and sepal-like, the inner 3 petaloid, imbricate and deciduous. Stamens hypogynous, usually 6 or more. Carpels free, sometimes in 1 whorl; ovules basal, 1 or more. Fruit a bunch or whorl of achenes like those of buttercups. Seeds curved, without endosperm, and with a horse-shoe-shaped embryo.

Temperate and tropical regions, mainly Northern Hemisphere.

Flowers solitary; carpels very numerous, crowded in a subglobose mass, beaked, compressed; sepals and petals distinct from each other 1. *Ranalisma*

Flowers in spikes, clusters or panicles:

Flowers sessile or subsessile at the nodes of a simple scape-like inflorescence, monoecious; bracts united into a membranous sheath; stamens 3; carpels 3-6, 3-ribbed on the back 2. *Wiesneria*

Flowers pedicellate:

Carpels very numerous, crowded, compressed; flowers few in whorls on an unbranched scape-like inflorescence 3. *Lophotocarpus*

¹ I am indebted to Mr. J. E. Dandy, who is making a special study of the family, for the full synonymy of this species, which is variable according to the depth and flow of the water in which it grows.

² The "*Vallisneria spiralis*" recorded in Hook. Niger Fl., p. 528, is *Eriocaulon latifolium* Sm.



FIG. 280.—*RANALISMA HUMILE* Hutch. (ALISMATACEAE).

A and B, whole plants in fruit. C, flower. D, stamen. E, fruits. F, mature carpel.
G, longitudinal section of carpel.

Carpels up to 20; inflorescence more or less paniculate:

Petals larger than the sepals; leaves sagittate or cordate:

Carpels about 20, pseudo-3-locular; inflorescence little-branched 4. *Limnophyton*

Carpels 6; inflorescence more or less branched 5. *Caldesia*

Petals smaller than the sepals; inflorescence much-branched; leaves acute at the base 6. *Burnatia*

1. *RANALISMA* Stapf in Hook. Ic. Pl. t. 2652 (1900).

A small herb with slender roots; leaves all radical, long-petiolate, ovate or oblong-elliptic, subacute, rounded at the base, about 3 cm. long and 1.5 cm. broad, glabrous, with 1 or 2 pairs of ascending nerves, with prominent oblique transverse nerves; flowers hermaphrodite, solitary on fairly long pedicels; sepals 3, herbaceous; petals 3, larger than the sepals; stamens 6 or more; carpels numerous in a subglobose head, long-beaked in fruit and compressed *humile*

R. humile Hutch. in Kew Bull. 1936: ined. *Echinodorus humilis* Buchen.—F.T.A. 8: 211; Chev. Bot. 686. *Sagittaria humilis* O. Kuntze.

A small annual herb resembling a buttercup; head of fruits prickly with the persistent styles.

French Sudan: Télé Lake (Apr.)! Nvafemke! Senegal: Kaédi (Dec.)! N. Nigeria: Katagum distr.! Extends through the Shari Region to the White Nile, Eastern Sudan. Exsicc.—Roger. Chev. 2592. *Dalz.* 311. *Leclercq* in Herb. Chev. 42467. *Rogeeon* 119.

2. *WIESNERIA* Micheli—F.T.A. 8: 213.

Roots few; leaves all radical, long-petiolate, elongate-linear-oblancoate, subobtuse at the apex, 9–12 cm. long, about 5–7 mm. broad, with an intramarginal nerve and faintly reticulate; petiole septate; flowers monoecious, in an unbranched scape, the females in whorls in the lower part, the males in the upper part; bracts united into a truncate membranous sheath; stamens 3; carpels 3–6, 3-ribbed on the back, beaked, muciculate on the margin *Schweinfurthii*

W. Schweinfurthii Hook. f.—F.T.A. 8: 214. Slender aquatic with the appearance of a *Potamogeton*; flowers monoecious.

Senegal: north of Tambacounda (Nov.)! N. Nigeria: Katagum distr.! Extends through the Shari districts to Eastern Sudan. Exsicc.—*Dalz.* 202. Chev. 33967.

3. *LOPHOTOCARPUS* Durand—F.T.A. 8: 210.

Rootstock small, with numerous slender roots; leaves all radical, long-petiolate, ovate in outline, deeply sagittate at the base, 5–9 cm. long, up to 8 cm. broad, with numerous nerves radiating from the base; scapes few-flowered, unbranched; flowers polygamous, few in each whorl, the lower hermaphrodite; pedicels stout; bracts triangular-ovate, up to 1 cm. long; sepals 3, veined; petals 3, larger; stamens 9–15; carpels numerous, crowded, compressed, with rugose margins *guayanensis*

L. guayanensis Dur. & Schinz (*guayanensis*) (1894).—F.T.A. 8: 210; Buchenau in Engl. Pflanzenr. 4, 15: 35, fig. 12. *L. gourmacus* A. Chev. Bot. 686, name only. *Sagittaria guayanensis* H. B. & K. *Lophiocarpus guayanensis* Micheli.

French Sudan: Gourma (July)! N. Nigeria: Katagum distr., in pools! Also in Eastern Sudan, Madagascar, Tropical Asia and America. Exsicc.—*Dalz.* 198. Chev. 24486.

4. *LIMNOPHYTON* Miq.—F.T.A. 8: 209.

Rootstock short, covered with thick roots; leaves all radical, long-petiolate, widely sagittate, up to 30 cm. long and 20 cm. broad, the basal lobes sometimes longer than the upper part, often acuminate, with numerous parallel nerves radiating from the base; tertiary nerves rather oblique and faint; flowers polygamous, in lax panicles, verticillate; bracts woolly-pubescent outside; pedicels slender, up to 3 cm. long; sepals 3, herbaceous, at length reflexed; petals obovate; stamens 6; carpels free, about 20 in a cluster; fruits obovoid, wrinkled when dry, about 5 mm. long

1. *obtusifolium*

Rootstock short, erect; leaves linear-lanceolate, caudate-apiculate, gradually narrowed to the base, 30 cm. long, 2.5 cm. broad, 3-nerved; flowers verticillate

2. *fruticans*

1. *L. obtusifolium* Miq.—F.T.A. 8: 209; Buchenau in Engl. Pflanzenr. 4, 15: 22, fig. 10. *Lophiocarpus guayanensis* A. Chev. Bot. 686, not of Dur. & Schinz. Aquatic, 3–4 ft. high; flowers white.

Senegal: Dakar and neighbourhood! French Guinea: Likuru, and common up to Farana (Feb.)! Gbegwema (Nov.)! Jigaya (Sept.)! Liberia: Gbanga! Togo: near Lome! N. Nigeria: Nupe! Sokoto! Katagum distr.! Tropical Africa generally, Madagascar, Tropical Asia. Exsicc.—*Hendelot* 231. *Roger* 60. *Sc. Elliot* 4972. *Deighton* 357. *Thomas* 2520. *Warnecke* 214. *Barter* 1532. *Lely* 161. *Dalz.* 199. *Cher.* 10254; 15788. *Linder* 385. (See Appendix).

2. *L. fruticans* Graebn. in Engl. Bot. Jahrb. 41: 274 (1908).

S. Nigeria: Oban! Also in French Cameroons. Exsicc.—*Talb.* 708.

5. *CALDESIA* Parlat. Fl. Ital. 3: 598 (1858).

(*Alisma* Linn., partly—F.T.A. 8: 207.)

Rootstock very short, with numerous stout roots; leaves radical, ovate-elliptic, deeply cordate, 8–12 cm. long, usually about 5 cm. broad, glabrous; petiole long and

slender; panicle thyrsoid, lax, about 30 cm. long; bracts narrowly lanceolate, very acute, the lowermost about 3 cm. long; flowers about 3 in each whorl; pedicel curved, up to 2 cm. long in fruit; sepals elliptic, 3 mm. long; petals 6 mm. long; stamens and carpels 6; fruiting carpels semi-lunar, woody, warted, about 4 mm. long 1. *oligococca*
 Rootstock as above, with numerous long roots; leaves radical, ovate-orbicular or suborbicular, deeply cordate, 6-7 cm. long, about 6 cm. broad, about 12-nerved from the base; transverse nerves numerous, slightly oblique, closely parallel; panicle large, lax, pyramidal; bracts ovate-lanceolate, up to 1 cm. long; flowers 3-4 in a whorl; pedicels about 2 cm. long; sepals broadly obovate-elliptic, 5 mm. long; carpels ribbed, sharply beaked 2. *reniformis*

1. *Caldesia oligococca* Buchenau in Engl. Bot. Jahrb. 2: 459, and in Engl. Pflanzenr. 4, 15: 16. *Alisma oligococcum* F. Muell.—F.T.A. 8: 208. A slender aquatic herb with rather large panicles of small flowers and prominently warted fruits.

N. Nigeria: Nupe! Also in India, Ceylon, and Australia. Exsicc.—Barter 1062.

2. *C. reniformis* Makino in Bot. Mag. Tokyo 20: 34 (1906). *Alisma reniforme* Don. *A. parnassifolium* C. H. Wright in F.T.A. 8: 208; Chev. Bot. 686; not of Bassl. *Caldesia parnassifolia* var. *nilotica* Buch.

Liberia: Gbanga (Sept.)! Dahomey: Abomey Circle; Khoun lagoon (fr. Mar.)! N. Nigeria: Bado! Matyoro (Oct.)! Also in Eastern Sudan, East Africa, Angola, Madagascar, and Eastern Asia. Exsicc.—Thornevill 96; 143. Chev. 23264. Linder 385.



FIG. 281.—*LIMNOPHYTON OBTUSIFOLIUM* Miq. (ALISMATACEAE).

A, leaf. B, inflorescence. C, flower. D, stamen. E, carpel. F, fruit. G, vertical section of fruit.

6. *BURNATIA* Micheli—F.T.A. 8: 212.

Rootstock small, ovoid-globose, with numerous slender roots; leaves all radical, long-petiolate, oblong-lanceolate, acute at each end, about 16 cm. long and 3-4 cm. broad, glabrous, with 2-3 lateral nerves on each side, not reticulate; male inflorescence a much-branched panicle longer than the leaves; bracts linear-lanceolate, up to 2 cm. long; pedicels slender, 6-8 mm. long; sepals rounded-elliptic, about 2 mm. long; petals small; female inflorescence much smaller and more compact than the male; carpels about 12, crowded, 1-seeded .. *enneandra*

B. *enneandra* Micheli—F.T.A. 8: 213; Chev. Bot. 686. A slender aquatic 3-4 ft. high, with *Plantago*-like leaves and panicles of very small white flowers; stem and leaves secreting white latex. French Sudan: Gourma; Fada (fr. July)! N. Nigeria: Zungeru, at margins of or in muddy pools (July)! Extends to Eastern Sudan, East and South Central Africa. Exsicc.—Dalz. 260. Chev. 24487.

149. TRIURIDACEAE

Leafless saprophytic herbs with simple or subsimple stems furnished with a few pale scales. Flowers very small, racemose or subcorymbose, with decurved bracteate pedicels, actinomorphic, monoecious, dioecious or rarely polygamous. Perianth-segments 3-8, 1-seriate, valvate, sometimes appendaged at the apex,

at length reflexed. Male flowers: stamens 2-6, sometimes only half of them fertile; anthers free or immersed in the mass of the receptacle, 2-celled, dehiscing mostly transversely; connective sometimes produced into long subulate appendages. Female flowers rarely with staminodes. Carpels several, free, 1-celled; style terminal to almost basal; ovule solitary, basal. Fruits crowded, opening by a slit. Seed erect, with a fleshy white oily undifferentiated nucleus.

Tropics; rare in Africa.

SCIAPHILA Blume Bijdr. 514 (1825).

Perianth 3-8-partite or deeply lobed. Anthers sessile or subsessile at the base of the perianth. Style ventral or basal in fruit.

Racemes about 9 cm. long, about 12-flowered; lower flowers female, upper male; leaves reduced to scales, ovate-triangular; bracts ovate-lanceolate, about 2 mm. long; pedicels curved, 7-8 mm. long, glabrous; perianth-segments reflexed, lanceolate, 1.25 mm. long, hairy at the tips (*vide* Engler); fruits ellipsoid; seeds ribbed, subacute at one end *I. Ledermannii*

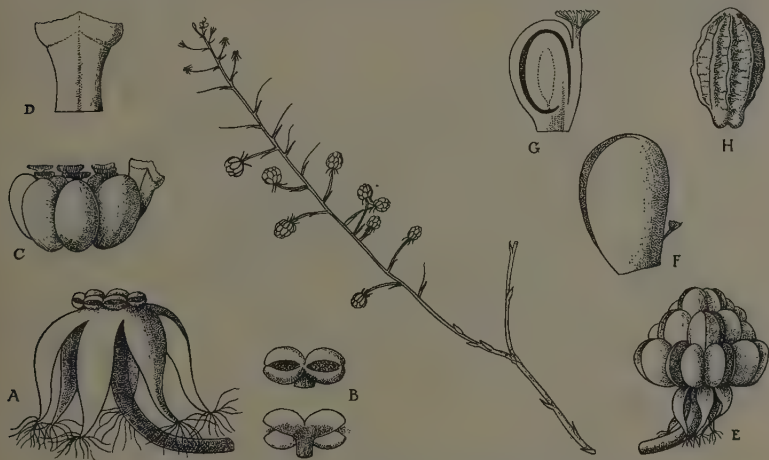


FIG. 282.—*SCIAPHILA LEDERMANNII* Engl. (TRIURIDACEAE).

A, male flower. B, front and back view of stamen. C, carpels and staminodes. D, staminode. E, female flower in fruit. F, carpel. G, vertical section of carpel. H, seed.—After Engler Bot. Jahrb. 43: 305 (1909).

Racemes 15-20 cm. long, with very numerous flowers; leaves linear-lanceolate, 3-4 mm. long; bracts linear, reflexed, persistent; pedicels spreading-recurved, slender, about 1 cm. long, pale glaucous-purple; perianth-segments 6, triangular, ending in a hair, not reflexed; fruits ellipsoid, minutely pitted when dry *2. africana*

1. *S. Ledermannii* Engl. Bot. Jahrb. 43: 304 (1909). A saprophytic herb in damp forest places; leaves reduced to scales.

S. Nigeria: Oban! Also in French Cameroons. Exsicc.—*Tabl.* 710; 1473.

2. *S. africana* A. Chev. in Bull. Soc. Bot. Fr. Mem. 8b: 96. A tall slender saprophyte about 1 ft. high, with small nodding unisexual flowers on slender pedicels.

Ivory Coast: Cavally basin; Tepo Country, Mt. Copé, 300-400 ft. (July)! Exsicc.—*Chev.* 19661.

150. APONOGETONACEAE

Fresh-water aquatic herbs with submerged or floating leaves; rhizome tuberous, with fibrous roots. Leaves long-petiolate, oblong-elliptic to linear, with few principal parallel nerves and numerous transverse secondary nerves. Flowers hermaphrodite or rarely unisexual, spicate-scapose, spike simple or usually 2- (rarely up to 8-) forked, without bracts. Perianth-segments 1-3, or absent, sometimes petaloid and bract-like, equal or unequal, usually persistent. Stamens 6 or more, free, hypogynous, persistent; anthers extrorse, 2-celled.

Carpels free, 3-6, sessile; style short; ovules 2 or more, ascending. Fruits opening on the adaxial side. Seeds without endosperm.

Warm regions from India and South China through Malaya to Australia, but most numerous in Tropical and South Africa and in Madagascar.

APONOGETON Thunb.—F.T.A. 8: 216; K. Krause & Engl. in Engl. Pflanzenr. Aponogetonac. 9 (1906).

Aquatic. Scapes simple or bifid, with unilateral flowers. Perianth-segments 1-3, white or coloured. Styles distinct.

Leaves long-petiolate, oblong, cordate at the base, obtuse at the apex, 16-20 cm. long, 3-4.5 cm. broad, with a broad midrib and 3 longitudinally parallel nerves on each side, and numerous closely parallel spreading transverse nerves between; spikes long-pedunculate, 2-forked, not secund, arms about 3 cm. long in flower, about 6 cm. long in fruit; fruiting carpels ovoid-ellipsoid, beaked; perianth small and bract-like

1. *subconjugatus*



FIG. 283.—*APONOGETON SUBCONJUGATUS* Schum. & Thonn. (APONOGETONACEAE).

A, flower. B, vertical section of carpel.

Leaves sessile, linear, up to 15 cm. long, subacute, with no distinct midrib but with several distinct longitudinally parallel nerves; peduncles very slender; spikes unbranched, secund, about 2 cm. long; basal bract oblong-lanceolate, apiculate, 1 cm. long; perianth-segments conspicuous, white, veined .. 2. *vallisnerioides*

1. *A. subconjugatus* Schum. & Thonn.—F.T.A. 8: 217. A. *Heudelotii* Engl. An aquatic in pools; petioles and leaf-blade elongated.

Senegambia! N. Nigeria: Katagum! Exsicc.—Heudelot. *Dalz.* 226. *Thonning.*

2. *A. vallisnerioides* Baker—F.T.A. 8: 218 Aquatic in pools on laterite; flowers white or pale violet.

Senegal: Tambacouda (Nov.)! Sierra Leone: Moyamba (Aug.)! N. Nigeria: "Niger"! Also in S.E. Sudan and Uganda. Exsicc.—Dawe 566. *Baikie.* *Chev.* 34017.

151. POTAMOGETONACEAE

Aquatic herbs of fresh water. Leaves alternate or opposite, those immersed thin, those above water often leathery, sheathing at the base, sheath free or partially adnate to the petiole. Flowers hermaphrodite, small, arranged in pedunculate axillary spikes; peduncle surrounded by a sheath at the base; bracts absent. Perianth of 4 free rounded shortly clawed valvate segments. Stamens 4, inserted in the claws of the segments; anthers extrorse, 2-celled, sessile. Carpels 4, free, 1-celled; stigma sessile or on a short style; ovule solitary, on the adaxial angle. Fruits free, 1-seeded, indehiscent. Seeds without endosperm.

One genus, *POTAMOGETON*, widely distributed.

POTAMOGETON Linn.—F.T.A. 8 : 219. Characters of the family.

Leaves 3-8-nerved :

Leaves broadly linear, narrowed to both ends, 15-25 cm. long and 2 cm. broad, very thin, with about 4 longitudinal nerves on each side of the midrib; spikes many-flowered, about 4 cm. long; fruits obliquely ovoid, beaked, 2-5 mm. long

1. *Schweinfurthii*

Leaves linear, very acute, 5-6 cm. long, 3 mm. broad, 3-nerved; spikes few-flowered; peduncle 3-5 cm. long, stout; flowering portion about 1 cm. long

2. *cetandrum*

Leaves 1-nerved, narrowly linear, 5-6 cm. long; spikes small and few-flowered, shortly pedunculate; fruits ovoid, beaked

3. *panormitanum*

1. *P. Schweinfurthii* A. Benn.—F.T.A. 8 : 220. *P. lucens* var. *fluitans* A. Benn.—F.T.A. 8 : 221, not of Coss. & Germ. Leaves nearly all submerged, elongate.

Senegal : Lake Guier (Jan.) ! E. and S. Africa. Exsicc.—Roger. Leprieux.

2. *P. cetandrum* Poir. Encycl. Suppl. 4 : 534 (1816). *P. Preussii* A. Benn.—F.T.A. 8 : 222, partly; Gracnber in Engl. Pflanzenr. Potamogetonac. 106, partly. *P. javanicus* Hassk.—F.T.A. 8 : 220.

N. Nigeria : Nupe; deep lake near Jeba ! S. Nigeria : Barombi ! Old World tropics. Exsicc.—Preuss 451. Barter 1069.

3. *P. panormitanum* Biv. Nuov. Pl. 6-7 (1838) : Hagstroem Kungl Sv. Vet. Akad. Handl. 55 : 98.

Mauritania : Adrar ! Cosmopolitan distribution. Exsicc.—Schmitt in *Herb. Chev.* 28504.

152. RUPPIACEAE

Aquatic herbs of saline marshes. Leaves opposite or alternate, linear or setaceous, sheathing at the base. Flowers hermaphrodite, small, in terminal spikes at first enclosed by the sheathing base of the leaves, at length much elongated; bracts and perianth absent. Stamens 2; filaments short, broad; anthers extrorse, cells reniform and separated by the connective. Carpels 4 or more, free, stigmas peltate or umbonate. Ovule solitary, pendulous. Fruits long-stipitate with spirally twisted stalks, indehiscent. Seeds pendulous, without endosperm.

Salt marshes throughout temperate and subtropical regions.

RUPPIA Linn.—F.T.A. 8 : 224.—Characters of the family.

Leaf-sheaths inflated; peduncles at length spirally coiled and elongated; drupes nearly symmetrically ovoid, 3 mm. long, dull when dry

1. *maritima*

Leaf-sheaths not inflated; peduncles short at time of flowering, not spirally coiled; drupes very obliquely ovoid, 2-5 mm. long, including the beak, shining when dry

2. *rostellata*

1. *R. maritima* Linn. Sp. Pl. 127. *R. spiralis* Hartm.—F.T.A. 8 : 224.

Senegal : Widely distributed in salt marshes in temperate and tropical regions. Exsicc.—Leprieux.

2. *R. rostellata* Koch ex Reichb. Ic. Pl. Crit. 2 : 266.—F.T.A. 8 : 224. *Potamogeton pusillus* Benth. Nig. Fl. 528, not of Linn. *P. pectinatus* A. Benn.—F.T.A. 8 : 223, partly, not of Linn.

Gold Coast : "Cape Coast !" S. Nigeria : Lower Niger ! Also in Angola and probably other parts of Africa, and in Europe and Asia. Exsicc.—Don. Vogel.

153. ZANNICHELLIACEAE

Submerged aquatic herbs in fresh, brackish, or salt water; rhizome creeping, slender. Leaves alternate or opposite, or crowded at the nodes, linear, sheathing at the base, sheaths mostly ligulate at the apex; flowering leaves sometimes reduced to sheaths. Flowers minute, monoecious or dioecious, axillary, solitary or in cymes. Perianth of 3 small free scales, or absent. Stamens 3, 2 or 1; anthers 2-1-celled, opening lengthwise; pollen globose or thread-like. Carpels 1-9, free; style simple or 2-4-lobed. Ovule solitary, pendulous. Fruits sessile or stipitate, indehiscent. Seed pendulous, without endosperm.

Widely distributed, mainly in salt water.

CYMODOCEA König.—F.T.A. 8 : 228 ; Graebner in Engl. Pflanzenr. 4, 11 : 146.

Perianth absent from the male flowers. Stamen 1, on a slender filament. Carpels curved.

Rhizome creeping, marked with circular scars at the nodes ; leaf-sheaths auriculate, up to 5 cm. long, deciduous ; leaf-blades linear, toothed near the apex, up to 1 m. long and 3-5 mm. broad, about 7-nerved ; male flowers long-pedunculate ; carpels 2, collateral, each with 2 long stigmas ; fruit sessile, obliquely ovoid, 1 cm. long, keeled, shortly beaked *nodosa*

C. nodosa Aschers.—F.T.A. 8 : 229 ; Graebner l.c. 147 ; Boiss. Fl. Orient. 5 : 21.
Senegal : Joulal, and mouths of the rivers (acc. to Boissier). Widely distributed on warm shores from Europe and Canaries to the Eastern Mediterranean. Exsicc.—(None seen from our area).

154. NAJADACEAE

Small submerged annual water-plants ; stem slender, much-branched. Leaves small, subopposite or verticillate, sessile, with a sheathing base and linear entire or toothed blade. Flowers unisexual, monoecious or rarely dioecious, very small. Male flower with 1 stamen ; perianth 2-lipped at the apex ; anther sessile, 1-4-celled. Female flower without a perianth or this very thin and adhering to the carpel. Ovary of 1 carpel, 1-celled, with 2-4 stigmas. Ovule solitary, erect. Fruit usually embraced by the leaf-sheath, indehiscent. Seed without endosperm.

One genus, widely distributed in temperate and warm regions.

NAJAS Linn.—F.T.A. 8 : 225 (Naias). Characters of the family.

Male and female flowers within a spathe ; flowers monoecious ; female spathe with a terminal outgrowth, the latter spine-tipped ; leaves with 12-18 short teeth on each margin ; basal sheath irregularly toothed, teeth tipped with spine-cells 1. *affinis*

Male flowers only within a spathe ; anthers 4-celled ; stems with numerous short lateral branches ; leaves falcate, coarsely toothed, the teeth longer than the width of the rhachis, the latter ending in a spine ; basal sheaths truncate, finely toothed ; fruits beaked ; seeds with about 20 rows of pits 2. *pectinata*

1. *N. affinis* Rendle.—F.T.A. 8 : 226.

Senegal : without loc. ! Exsicc.—Leprieur.

2. *N. pectinata* Magnus in Aschers. & Schweinf. Illustr. Fl. Egypt. 145 (1880). *N. horrida* A. Br.—F.T.A. 8 : 228. *Caulina pectinata* Parl.

Senegal : Lake Guier ! Walo, near Keurmbaye (May) ! *N. Nigeria* : Nupe, deep lake near Jeba ! *S. Nigeria* : Johann-Albrechtshöhe ! Extends to Eastern Sudan, East Africa, and in North and South Africa and Madagascar. Exsicc.—Pruess 452.

155. COMMELINACEAE

Perennial herbs. Leaves with a basal membranous often nervose closed sheath. Flowers usually actinomorphic, hermaphrodite, in axillary clusters or in terminal cymes or panicles, mostly blue or white. Perianth 2-seriate, the outer sepal-like, inner petal-like and usually free. Stamens 6 or fewer, hypogynous ; filaments sometimes adorned by moniliform hairs ; anthers basifixed, opening by slits lengthwise or rarely by pores. Ovary superior, 3- (rarely 2-) celled ; style terminal, simple. Ovules few to 1 in each cell, axile. Fruit a capsule or berry. Seeds usually crowded with the contiguous faces flat, mostly muricate, ridged or reticulate ; endosperm abundant, mealy ; embryo marginal or nearly so, its position indicated on the outside of the seed by a disk-like callosity (embryotega or embryostega).

Mainly in moist tropical and subtropical regions.

Inflorescence or flower not enclosed in or subtended by a spathaceous bract ;

Fruit dehiscent :

Fertile stamens 5-6 :

Capsule 3-celled ; seeds 4-10 in each cell 1. *Bufoerestia*

Capsule 3-celled ; seeds 1-2 in each cell ; inflorescence perforating the leaf-sheath 2. *Forrestia*

Capsule 2-celled ; seeds solitary in each cell, ribbed 3. *Floscopa*

Fertile stamens 2-3 ; seeds several in each cell 4. *Anileima*

Fruit indehiscent :

Leaf-margins glabrous or nearly so ; fruit crustaceous, shining blue or blue-black

5. *Pollia*

Leaf-margins silky-hairy ; fruit fleshy 6. *Palisota*

Inflorescence subtended by or enclosed in a spathaceous bract :

Fertile stamens 5-6 ; bracts numerous and conspicuous, the outermost mostly larger than the others 7. *Cyanotis*

Fertile stamens 2-3 :

Spathes solitary in each inflorescence 8. *Commelina*

Spathes numerous and scattered in each inflorescence, the latter with hooked hairs on the axis 9. *Polyspatha*

1. *BUFORRESTIA* C.B.Cl.—F.T.A. 8 : 76.

Stems and leaf-sheaths glabrous or at most finely scaberulous, sheaths about 2 cm. long, longitudinally nerved ; leaves obovate-elliptic, acutely and rather abruptly acuminate, narrowed to the base, 12-17 cm. long, 5-7.5 cm. broad, with about 10 nerves on each side, tertiary nerves oblique and faint ; inflorescence emerging from a hole in the leaf-sheath, slender, pendulous, about 10 cm. long, glabrous ; sepals oblong-lanceolate, glabrous and nervose in fruit and then 1.5 cm. long ; petals 3, obovate ; capsule 1.3 cm. long ; seeds coarsely warted 1. *Mannii*

Stems and leaf-sheaths more or less densely pilose or pubescent, sheaths about 1 cm. long, longitudinally nerved ; leaves elliptic-lanceolate, gradually acute, more or less ciliate at the acute base, 8-10 cm. long, 2.5-4 cm. broad, pilose-setose above to glabrous, with about 7 nerves on each side ; inflorescence terminal and from the upper axils, emerging from the top of the sheath, pilose ; sepals thinly glandular-pilose, 6-7 mm. long in fruit ; capsule 1 cm. long, slightly setose ; seeds very small and smooth

2. *imperfiorata*

1. *B. Mannii* C.B.Cl.—F.T.A. 8 : 76. Herb 2 ft., with " green calyx and white corolla."

Liberia : without loc. ! Fernando Po (fr. Dec.). Also in Cameroons. Exsicc.—Mann 96. Cook 145.

2. *B. imperfiorata* C.B.Cl. in DC. Monogr. Phan. 3 : 234, t. vii.—F.T.A. 8 : 76 ; Chev. Bot. 669. A herb

rooting at the nodes, in swamps or dense forest ; flowers dull white in a short terminal panicle ; variable

as to hairiness.

Sierra Leone : Yonibana ! Scarcies ! Liberia : Du River ! Gbanga ! Ivory Coast : Morénou ! Gold

Coast : E. Akim (Mar.) ! Amentia ! S. Nigeria : Sapoba ! Likomba ! Cameroons Mt., 2,500 ft. !

Fernando Po, 2,000 ft. ! Also in French Cameroons. Princes Island and Uganda. Exsicc.—Sc. Elliot 4678

partly. Thomas 4116. Chev. 22466. Johnson 600. Irvine 442. Kennedy 420. Mann 1340. Mildbr. 10562.

Linder 174 ; 732.

2. *FORRESTIA* A. Rich.—F.T.A. 8 : 77.

Stems angular, glabrous, internodes very long ; leaf-sheaths 1.5-2 cm. long, ribbed, ciliate at the top ; " petiole " 1-1.5 cm. long, very shortly pubescent ; blade obovate or obovate-elliptic, triangular-acuminate, 6-11 cm. long, 3-5.5 cm. broad, with about 4 lateral nerves and very marked and closely parallel transverse nerves ; inflorescence subsessile, perforating the base of the leaf-sheath, about 1.5 cm. long ; bracts greenish, ovate, 4-5 mm. long, glabrous *Preussii*

F. Preussii K. Schum. in Engl. Bot. Jahrb. 24 : 344. *F. africana* K. Schum. ex C.B.Cl. in F.T.A. 8 : 77. Up to 5 ft. high.

Cameroons Mt. : Victoria Distr., in forest (Apr.) ! Also in French Cameroons. Exsicc.—Preuss 1319.

Maidland 669.

3. *FLOSCOPA* Lour.—F.T.A. 8 : 84.

Connate margins of leaf-sheaths pubescent, the hairs usually continued in a line below the sheath ; top of sheath long-ciliate :

Inflorescence pubescent with very short hairs, usually rather lax :

Leaves broadly lanceolate, the blade contracted at the base into a short " petiole "

above the sheath, long-acuminate, 6-12 cm. long, 2-3 cm. broad, glabrous ;

inflorescence nearly glabrous, the branches becoming elongated and the fruits

more or less secund 1. *africana*

Leaves elliptic, acute, not acuminate, contracted at the base into a short " petiole,"

4-6 cm. long, 2 cm. broad ; sheath densely villous ; inflorescence divaricately

branched 2. *Mannii*

Leaves linear or linear-lanceolate, the blade not contracted into a " petiole," 5-7 cm.

long, scarcely up to 1 cm. broad, glabrous ; inflorescence more or less glomerate

with short branches, distinctly pubescent 3. *pauciflora*

Inflorescence pilose with rather long jointed hairs, rather densely glomerate ; leaf-

blades lanceolate to linear-lanceolate, subacute, 6-10 cm. long and up to 2 cm.

broad, glabrous ; seeds ribbed 4. *rivularis*

Connate margins of leaf-sheaths glabrous ; no line of hairs on the stem below the sheath :

Inflorescence simple or little-branched with short branches :

Stems with well-developed leaves to the top, glabrous ; leaves narrowly triangular-

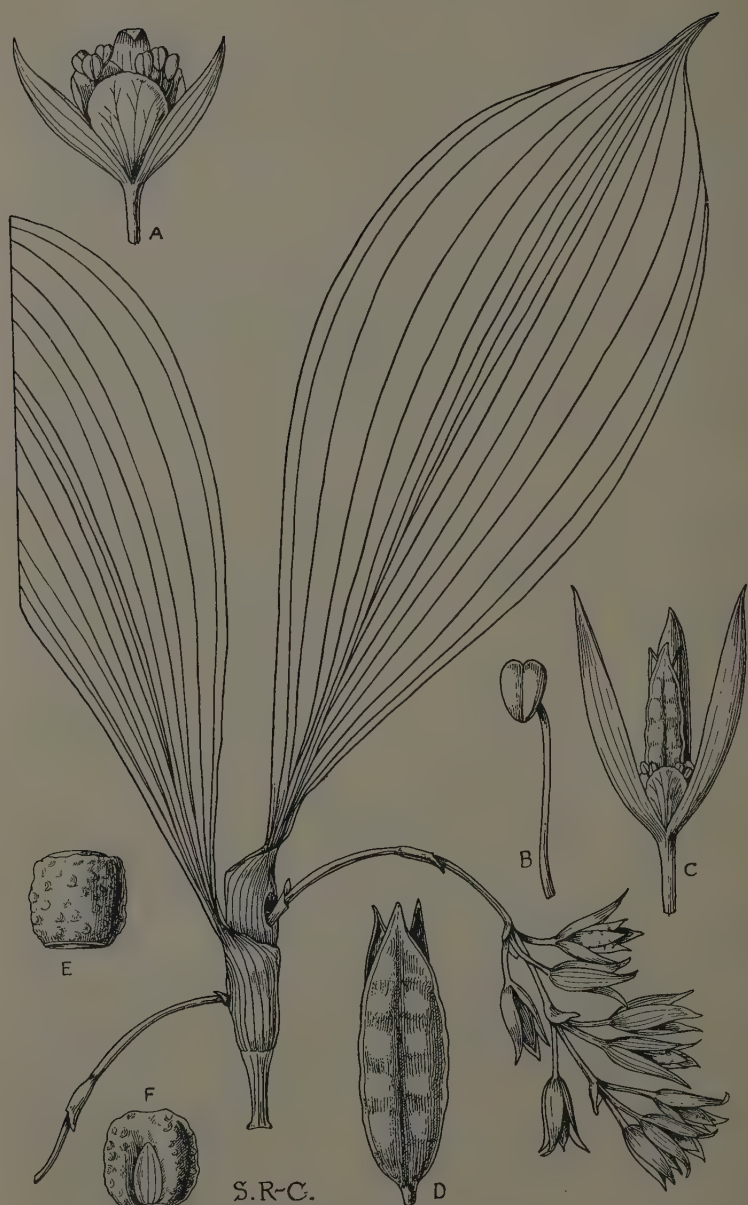


FIG. 284.—*Buforrestia Mannii* C.B.Cl. (COMMELINACEAE).

A, flower. B, stamen. C, young fruit and persistent floral parts. D, fruit. E and F, seeds.

lanceolate, acute, about 3 cm. long; sheaths very short; inflorescence very few-flowered, glabrous or nearly so 5. *myosotoides*

Stems very short, with the leaves mostly basal; a small tufted annual; leaf-sheath very short and V-shaped; leaf-blades up to 5 cm. long, glabrous; inflorescence few-flowered, glaucous-purple, thinly strigose-pubescent 6. *flavida*

Inflorescence much-branched or with elongated many-flowered branches:

Inflorescence subglomerate, with short few-flowered branches; stems and leaf-sheaths purplish, the latter thinly pilose-ciliate at the top; leaf-blade linear-lanceolate, broadened from the base upwards, about 5 cm. long, 6-7 mm. broad; seeds nearly black, ribbed 7. *Lelyi*

Inflorescence with slender elongated many-flowered branches; stems not purple; leaf-sheath very short and not ciliate at the top, blades lanceolate to linear-lanceolate, acute, 4-5 cm. long, glabrous; seeds dark blue, ribbed 8. *axillaris*

1. *Floscopa africana* C.B.Cl.—F.T.A. 8: 85, incl. var. *majuscula* C.B.Cl.; Chev. Bot. 670, partly. *F. africana* var. *radicans* A. Chev. *Anelasma africanum* Beauv. Fl. Owar. 2: 57, t. 93, fig. 1. An aquatic or marsh plant, often rooting at the nodes, with dense oblong panicles of small blue or white flowers.

Sierra Leone: Regent (Dec.)! Njala (Nov.)! Geygwama (Nov.)! Moselelo (Nov.)! Rogbin (Oct.)! Ivory Coast: Middle Comoé (Dec.)! Liberia: Kayapulu (Oct.)! Banga! Gold Coast: Birrim River! Dawa Male Kolo (Dec.)! N. Nigeria: Kontagora (Dec.)! S. Nigeria: Lagos Colony! Likomba! Agagee! Koboro! Oban! Victoria! Through the Cameroons to the Congo, Uganda and Tanganyika. Exsicc.—*Sc. Elliot* 3918. *Deighton* 399; 2374; 2427. *Thomas* 3227; 6293. *Glanville* 49. *Chev.* 22606; 22608. *Irvine* 1167; 1758. *Dalz.* 270; 8148. *Millen* 95; 154. *Talb.* 909. *Maitland* 1304. *Mildbr.* 10775. *Linder* 1139; 1176. *Carpenter* 270.

2. *F. Mannii* C.B.Cl.—F.T.A. 8: 86. A low herb rooting at the nodes; stems and leaf-sheaths villous. S. Nigeria: Oban! Also in Spanish Guinea. Exsicc.—*Talb.* 756.



FIG. 285.—*FLOSCOPA FLAVIDA* C.B.Cl. (COMMELINACEAE).

A, open flower. B, stamen. C, fruit. D, vertical section of fruit. E, top, and F, side view of seeds.

3. *F. pauciflora* C.B.Cl.—F.T.A. 8: 88. Slender, rooting at the lower nodes; leaves linear; flowers blue or white; seeds glaucous, closely ribbed.

French Guinea: Kouroussa (Oct.)! Futa Jallon! Sierra Leone: Lomabum, Scarcies! Kamasigi (Oct.)! Kaballa (Sept.)! Seli R. (Oct.)! Gorahun (Nov.)! Konta (Aug.)! between Gboyama and Bendu (Apr.)! Exsicc.—*Pobéguin* 578; 579. *Chev.* 18255. *Sc. Elliot* 5030. *Glanville* 47. *Thomas* 2259; 3112. *Deighton* 361; 1255; 1591.

4. *F. rivularis* C.B.Cl.—F.T.A. 8: 86. A semi-erect marsh herb up to 3 ft., with a terminal very hairy cluster of small pink or blue flowers.

French Guinea: Kouroussa (Oct.)! Sierra Leone: Ronietta (Nov.)! Juring (Dec.)! Gold Coast: Brumaba (Jan.)! N. Nigeria: Sokoto, near Argungu (Oct.)! Bauchi Plateau (Oct.)! Panyan (Sept.)! Extends to Abyssinia, East Africa and Rhodesia. Exsicc.—*Pobéguin* 577. *Thomas* 5528. *Deighton* 308. *Irvine* 1081. *Dalz.* 450. *Lely* 729; P. 842.

5. *F. myosotoides* Hutch. in Kew. Bull. 1936: ined. A creeping herb with blue flowers like *Myosotis*, in moist sandy soil in thickets.

Senegal: Casamance (Feb.)! French Guinea: Konkouré (Oct.)! Futa Jallon (Sept.)! Sierra Leone: Mamaba! Malema (Nov.)! Materboi (Oct.)! Masactaba (Oct.)! Njala (Oct.)! Liberia: Monrovia. Exsicc.—*Pobéguin* 2582. *Caille*. *Chev.* 18660. *Thomas* 3614; 4552. *Deighton* 334; 1338. *Glanville* 18; 50. *Linder* 1412.

6. *F. flavida* C.B.Cl.—F.T.A. 8: 87. *F. pusilla* K. Schum. A tiny bog plant with small yellow flowers.

N. Nigeria: Borgu! Kontagora (Nov.)! Kabba Road! Naraguta! Also in the Eastern Sudan, and in the Zambesi Basin from Angola to Nyasaland. Exsicc.—*Barter* 760. *Dalz.* 271. *Parsons* 61. *Lely* 554.

7. *F. Lelyi* Hutch. in Kew Bull. 1936: ined. Herb about 1-2 ft. high, in stony stream-beds; flowers purple. N. Nigeria: Naraguta (Nov.)! Exsicc.—*Lely* 704.

8. *F. axillaris* C.B.Cl.—F.T.A. 8: 87. *F. Elliottii* C.B.Cl.—F.T.A. 8: 88; Chev. Bot. 671. In marshes; flowers blue. Senegal: Casamance (Jan.)! French Guinea: Grandes Chutes (Dec.)! Sierra Leone: Kitchom, Scarcies (Dec.)! Tisana, Bonthe Island, common (Nov.)! Exsicc.—*Pobéguin* 2581. *Chev.* 20238. *Sc. Elliot* 4340. *Deighton* 2304.

4. ANEILEMA R.Br.—F.T.A. 8: 62.

Ultimate bracts very minute and early deciduous:

Axis of branches of inflorescences rugose with the scars of the fallen pedicels; leaves long-linear, acute, up to 40 cm. long, glabrous, closely nerved; capsule 3-celled, valves mucronate, about 6 mm. long 1. *sinicum*
 Axis not rugose and flowers very few on slender pedicels 10. *tenuissimum*

Ultimate bracts persistent:

Leaves ovate-elliptic or broadly oblong-lanceolate, at most about 3-4 times as long as broad:

Inflorescence lax:

Stems villous with long hooked hairs, stout; leaves 7-12 cm. long, 2.5-4.5 cm. broad, gradually pointed, very shortly pubescent on both surfaces; sheath about 2 cm. long; pedicels stout in fruit; fruit oblong, obliquely truncate, 1 cm. long 2. *aequinotiale*

Stems very shortly pubescent or glabrous:

Leaf-sheaths minutely pubescent outside; blades up to 10 cm. long and 3 cm. broad, minutely pubescent; sheath at most 1 cm. long, thinly and shortly pubescent; pedicels slender in fruit; fruit oblong-elliptic, emarginate at the apex, 5 mm. long 3. *umbrosum*

Leaf-sheaths setose-pilose with rust-coloured hairs; blades 8-15 cm. long and up to 4 cm. broad, pilose to nearly glabrous; fruit 5 mm. long, shining

4. *nigritanum*

Inflorescence very dense with numerous branches crowded on the short axis; stems glabrous or nearly so; leaves oblong-elliptic or broadly oblong-lanceolate, acutely rather long-acuminate, 10-15 cm. long, 3.5-6 cm. broad, glabrous, narrowed to the base into a stalk; sheath glabrous or nearly so; fruit oblong-ellipsoid, 8 mm. long 5. *beniniense*

Leaves linear or linear-lanceolate:

Stems setose with stiff crimson hairs; inflorescence many- and dense-flowered; leaves setulose on both surfaces, 5-12 cm. long, up to 1.8 cm. broad, broad and sessile on the sheath; fruits obliquely ellipsoid, about 6 mm. long 6. *setiferum*

Stems shortly pubescent or glabrous:

Inflorescence many-flowered, often elongated, puberulous:

Leaves variable in size but always broadly oblong-linear or oblong-lanceolate, broadened into the sheath, up to 20 cm. long and 1.5 cm. broad, glabrous or shortly pubescent; fruits oblong-elliptic, widely emarginate, about 7 mm. long 7. *lanceolatum*

Leaves narrowly linear and rather short, up to 6 cm. long; inflorescence slender and raceme-like; fruits as above but rounded or subtruncate at the apex

8. *subnudum*

Inflorescence few-flowered:

Flowers very shortly pedicellate; leaves as in preceding species but scabridulous; fruits didymous, dull ivory white 9. *paludosum*

Flowers on slender pedicels; stems wiry, grass-like, glabrous; leaves linear, 4-5 cm. long, sparingly ciliate; capsule 3-celled 10. *tenuissimum*

1. *Aneilema sinicum* Lindl. in Bot. Reg. t. 659.—F.T.A. 8: 63; incl. vars.; Chev. Bot. 668. A fragile herb of wet places, with short panicles of bluish green or lilac flowers.

French Guinea! French Sudan! Sierra Leone: Bumban to Port Lokko (Apr.)! Ivory Coast: Mankano distr. (July)! Baoulé Nord (July)! Gold Coast: Winnebah Plain (Feb.)! Afram Plains (Mar.)! Dahomey! N. Nigeria: Kibba country (Aug.)! Mongu, 4,300 ft. (July)! Bauchi Plateau (July)! Abinal (Mar.)! S. Nigeria: Oban, etc.! Widely spread in the tropics and subtropics of the Old World. Exsicc.—Se. Elliot 5742. Chev. 22011; 22089. Dalc. 258; 802; 8281. Johnson 712. Irvine 709. Lely P. 285; P. 399; 406. Talb. 752; 753. Aëb. Dom.

2. *A. aequinotiale* Kunth.—F.T.A. 8: 65; Chev. Bot. 668. *Commelina aequinotialis* Beauv. Fl. Owar. 1: 65, t. 38. Herbaceous, up to 8 ft., the stems clothed with hooked hairs; flowers yellow.

Liberia: Peahat (Oct.)! Ivory Coast: several localities! Gold Coast: Agogo (Jan.)! Dumassi! S. Nigeria: Lagos colony! Calabar River (Feb.)! Widely spread in tropical Africa, South Africa, Mascarenes and Arabia. Exsicc.—Irvine 877. Cummins 19. PUNCH. Rowland. Mann 2338. Chev. 17399; 17401; 21159. Linder 1010. Carpenter 377.

3. *A. umbrosum* Kunth Enum. Pl. 4: 71. *A. ovato-oblongum* Beauv. Fl. Owar. 2: 71, t. 104, fig. 1.—F.T.A. 8: 69; Chev. Bot. 667; Stapf 660. A weak-stemmed herb rooting at the lower nodes, sometimes epiphytic (on Oil Palm), with lax panicles of small white flowers.

Sierra Leone: Makump (Aug.)! Berria (Mar.)! Mayoso (Aug.)! Yonibana (Oct.)! Liberia: Cape Palmas (July)! Peahat (Oct.)! Du River (Aug.)! Ivory Coast: common! Gold Coast! Dahomey: Porto Novo! N. Nigeria: Mt. Patti (Nov.)! S. Nigeria: Lagos; Ikoji Plains (May)! Oban! Fernando Po! Extends to Gabon and Angola. Exsicc.—Se. Elliot 5424. Deighton 1204. Thomas 1420; 4250. Ansell. Burton and Cameron. Dalc. 255; 1289. Talb. 755. Barter. Chev. 16780 ter, etc. Linder 325; 1079.

4. *A. nigritanum* Hutch. in Kew Bull. 1936: ined. *A. ovato-oblongum* var. *nigritanum* C.B.Cl.—F.T.A. 8: 69; Chev. Bot. 667. Like the last but the leaf-sheaths setose with rusty hairs.

Ivory Coast: granite country north-east of Fort Binger (July)! N. Nigeria: Jeba! S. Nigeria: Bamenda! Fernando Po! Exsicc.—Chev. 19494. Barter. Migeod 474.

5. *A. beniniense* Kunth.—F.T.A. 8: 68; Chev. Bot. 666; Stapf 659; Holl. 712. *Commelina beninensis* Beauv. Fl. Owar. 2: 49, t. 87. A herb of moist places with whitish or pale blue flowers.

From French Guinea to S. Nigeria and Fernando Po., and other parts of tropical Africa. Exsicc.—



FIG. 286.—*ANEILEMA SINICUM* Lindl. (COMMELINACEAE).

A, portion of rachis of inflorescence showing scars of fallen pedicels. B, open flower. C, stamen. D, staminode. E, young fruit. F, ripe fruit. G, open fruit. H, seed.

- Deighton 252; 2107. Thomas 2856; 5562. Vogel 40. Cooper 7. Linder 1034. Irvine 458. Vigne 1317. Johnson 249. Dalz. 268; 8265, etc. (See Appendix).
6. *A. setiferum* A. Chev. in Bull. Soc. Bot. France 58: Mem. 8: 215. A stiff herb with thick roots, the stems clothed with stiff purple hairs, the short dense inflorescence usually enclosed in mucilage; chiefly in savannah country.
French Sudan: Sikasso (Aug.)! Ivory Coast: Orodougou. Dahomey: near Savallou (May)! N. Nigeria: Abinsi (May)! Exsicc.—Chev. 801; 23680. Dalz. 810.
7. *A. lanceolatum* Benth.—F.T.A. 8: 72, incl. var. *evolutior* C.B.Cl. *A. soudanicum* C.B.Cl. *A. buaricum* Mildbr. *A. Schweinfurthii* A. Chev. Bot. 667, not of C.B.Cl. A herb with long thick pubescent roots and broadly sheathing linear-lanceolate leaves and short panicles of white or pale violet flowers.
French Guinea: Timbo to Farana (Apr.)! Gold Coast: various localities! N. Nigeria: numerous localities! S. Nigeria: Lagos, Interior! Also in Cameroons and Eastern Sudan. Exsicc.—Anderson 10; 17. Chipp 634. Johnson 700. Vogel 101. Dalz. 267; 449; 806; 807. Lely 80; 138; P. 203; P. 348. Barter 1018; 1117. Rowland. Chev. 13307. (See Appendix).
8. *A. subnudum* A. Chev. in Bull. Soc. Bot. Fr. 58: 216. *A. gracile* C.B.Cl., F.T.A. 8: 73 (not *Lamprothyros gracilis* Kotschy & Peyr.). Stems very slender about 12 in. high, glabrous or nearly so; roots thick but glabrous; flowers bluish purple or rose; bracts numerous and imbricate on the branches of the inflorescences.
French Sudan: Gourma! Zandéla! Meana! French Guinea: Faradiana (Mar.)! Ivory Coast: Mankono (July)! Gold Coast: Walembi (Apr.)! N. Nigeria: Nupe, in cultivated soils! Also in Ubangi. Exsicc.—Chev. 22006; 24469, etc. Kilson 820. Barter 1474.
9. *A. paludosum* A. Chev. in Bull. Soc. Bot. France 58: Mem. 8: 215. A herb branched from the base, with small inflorescences of white flowers and clusters of didymous shining fruits.
French Sudan: Koulikoro (Oct.)! Ivory Coast: various localities! N. Nigeria: Kumu, in bogs (Oct.)! Exsicc.—Chev. 22246, etc. Lely 670.
10. *A. tenuissimum* A. Chev. Bot. 668, name only. *Baoulia tenuissima* A. Chev.
Ivory Coast: Baoulé-Nord; Kodikofu (fr. Aug.)! Exsicc.—Chev. 22318.

5. POLLIA Thunb.—F.T.A. 8: 26.

A herb; stems strongly ribbed, glabrous; leaves sheathing and embracing the stem at the base, oblong-lanceolate, acutely acuminate, acute at the base and tapered into a pseudo-petiole about 1.5 cm. long; 9–12 cm. long, 2–3 cm. broad, glabrous; parallel nerves about 5 on each side of the midrib, with inconspicuous slightly oblique transverse nerves; panicles terminal, shorter than the leaves, few-flowered, puberulous; bracts lanceolate; fruit blue-black, ellipsoid, 6 mm. long, shining

1. Mannii

A stout herb; stems glabrous; leaf-base as above but pseudo-petiole much shorter, elongate-obovate-elliptic, acuminate, narrowed to the base, up to 30 cm. long and 9 cm. broad, glabrous; parallel nerves about 9 on each side of the midrib with rather close oblique transverse nerves; panicle spike-like, very dense, oblong-ellipsoid, about 3.5 cm. long; fruits dark blue or deep pink, suborbicular, shining, about 6 mm. diam. 2. *condensata*

1. *P. Mannii* C.B.Cl.—F.T.A. 8: 26; Chev. Bot. 660. A slender herb with long roots from the lower nodes. Ivory Coast: Middle Comoé (fr. Dec.)! Gold Coast: Birrim distr. (fr. Nov.)! Also in Cameroons, Uganda and St. Thomas Island. Exsicc.—Chev. 22570. Fishlock 71.
2. *P. condensata* C.B.Cl.—F.T.A. 8: 27; Chev. Bot. 660. A stout herb 4–6 ft. high in dense forest, with a terminal subsessile cluster of white or rose flowers.
Sierra Leone: Talla hills! Liberia: Gbanga! Ivory Coast: various localities! Gold Coast: Assin Yan Kumasi! Kumasi! S. Nigeria: Oban! Likomba! Fernando Po! Also in Cameroons, St. Thomas, Princes Island, Uganda and Tanganyika Territ. Exsicc.—Sc. Elliot 4851. Cummins 82. Irvine 90. Talb. 744. Barter 1518. Mann 93. Vogel 7b. Chev. 16554 bis, etc. Linder 873. Mildbr. 10528. (See Appendix).

6. PALISOTA Reichenb.—F.T.A. 8: 27.

Inflorescence long and slender, lax-flowered; leaves densely ciliate:

Peduncles short (about 5 mm. long) and stout, curved, corrugated on the upper side; leaves apparently whorled at the end of the stem, shortly petiolate, oblong-oblancoate to obovate, acutely acuminate, narrowed to the base and there long-ciliate, 15–20 cm. long, 5–8 cm. broad; parallel nerves about 8 on each side of the midrib; inflorescence solitary at the end of the shoot 1. *ambigua*

Peduncles long (about 1 cm. or more) and slender, curved; leaves mostly scattered on the stem, otherwise more or less as above, but often more villous on the midrib; inflorescences often 3 together at the end of the shoot, the middle one the longest; fruits dull when dry, about 1 cm. long 2. *hirsuta*

Inflorescence dense-flowered, stout:

Inflorescence narrow, at least 5 times as long as broad; lateral nerves of leaves about 6 pairs:

Upper leaves not bract-like; stems slender, ribbed; leaves oblong-lanceolate, about 25 cm. long and 6 cm. broad, densely ciliate 3. *Preussiana*

Upper leaves bract-like, gradually smaller, about 30 cm. long and 8 cm. broad, densely villous at the base 4. *Mannii*

Inflorescence short and thick, at most twice as long as broad:

Inflorescence with conspicuous bracts between the flowers; pseudo-petiole up to 12 cm. long, villous, blade elongate-obovate-elliptic, acutely acuminate, 25–30 cm. long, 7–12 cm. broad, densely ciliate, with 6–8 pairs of ascending nerves; peduncle very short; bracts long-pilose-ciliate; perianth about 7 mm. long, glabrous

5. bracteosa

Inflorescence without visible bracts between the flowers; leaves more or less as in preceding; peduncle as long as or longer than the inflorescence, the latter up to

11 cm. long; petioles very long-pilose-ciliate; pedicels slender; perianth 4 mm. long, glabrous or nearly so 6. *Barteri*

1. *Palisota ambigua* C.B.Cl.—F.T.A. 8: 31. *Commelina ambigua* Beauv. Fl. Owar. 1: 26, t. 15. A herb with long hairs and clusters of leaves at the top with slender spike-like inflorescences. S. Nigeria: Lagos! Oban! Rio del Rey! Extends to Congo. Exsicc.—Millen 201. Talb. Johnston 1. Carpenter 331: 354.

2. *P. hirsuta* K. Schum. in Engl. Bot. Jahrb. 24: 347. *Dracaena hirsuta* Thunb. *P. thyrsiflora* Benth., partly—F.T.A. 8: 31; Chev. Bot. 661; Stapf 659; Holl. 711. *P. ambigua* A. Chev. Bot. 661, not of C.B.Cl. *P. laxiflora* A. Chev. Bot. 661, not of C.B.Cl. *P. prionostachys* C.B.Cl. *P. Macclaudii* Gandoger. Habit and hairiness very variable, up to 9 ft. high.

3. *P. Freusiana* K. Schum. ex C.B.Cl.—F.T.A. 8: 30. Roots thick, hairy; stems elongated, ribbed; inflorescence about half as long as the leaves. Cameroons Mt.: Buea! Exsicc.—Preuss 996. Migeod 87.

4. *P. Mannii* C.B.Cl.—F.T.A. 8: 29. Herb 2 ft. high, very silky. Cameroons Mt.: 2,000–3,000 ft. (Dec.)! Above Buea, 4,000–5,000 ft. (Feb.)! Fernando Po, 3,000 ft. (Mar.)! Exsicc.—Mann 2139: 2340. Kalbreyer 163. Dalz. 8349.

5. *P. bracteosa* C.B.Cl.—F.T.A. 8: 25; Chev. Bot. 661. *P. Barteri* A. Chev. Bot. 661, not of Hook f. *P. Cailliei* A. Chev. Bot. 661. A thick bush with densely clustered small white flowers. French Guinea: Billima (Sept.)! Futa Jallon (Sept.)! Sierra Leone: Samu country! Malema (fr. Nov.)! Hanga! Bumbuna! Yonibana! Gold Coast: Banka! Ivory Coast: various localities! Also in French Cameroons and St. Thomas. Exsicc.—Sc. Elliott 5933. Deighton 299. Thomas 3434; 4992; 7785. Chev. 17676; 17680; 18526; 18756. Irvine 496. Talb. 741. (See Appendix).

6. *P. Barteri* Hook. f. in Bot. Mag. t. 5318.—F.T.A. 8: 29; Holl. 711. *P. Mannii* A. Chev. Bot. 661, not of C.B.Cl. *P. pseudoambigua* A. Chev. Bot. 662. *P. Staudtii* K. Schum. (from descr.). Herbaceous 1–1½ ft.; flowers white; inflorescence sometimes branched.

- Ivory Coast: Baoulé Nord, etc. (July)! S. Nigeria: Sapoba! Oban! Tiko! Fernando Po (Dec.)! Also in French Cameroons. Exsicc.—Chev. 16938; 17168; 17981; 22048. Kennedy 422; 1751. Talb. 908. Dunlap 163. Mann 94. (See Appendix).

Imperfectly known species

- P. bicolor* Mast. in Gard. Chron. 1878: 527; F.T.A. 8: 32. Fernando Po. Originally described from a cultivated plant.

7. CYANOTIS D. Don—F.T.A. 8: 78.

Outer bract not longer than the inflorescence or only very slightly so; stem covered at the base with the persistent very hairy leaf-bases; leaves radical, lanceolate, acute, up to 20 cm. long and 3–5 cm. broad, glabrous above and finely pitted, pilose below; inflorescence 1-sided; bracts lanceolate, acute, 6–8 mm. long 1. *caespitosa*

Outer bract much longer than the inflorescence;

Roots fibrous or tuberous:

Indumentum of leaves, stems and bracts white-woolly, at length wearing off; leaves linear, up to 18 cm. long, with a basal tubular sheath about 2 cm. long; flowers capitate, heads terminal and axillary; outer bract 2–3 times as long as the head 2. *lanata*

Indumentum of leaves, stems and bracts long-pilose or softly pubescent or absent:

Internodes pubescent or pilose, greenish or pale:

Leaf-sheaths long-pilose:

Outer bract several times as long as the inflorescence, leaf-like and spreading, very thinly pilose, 6–8 cm. long; second bract $\frac{1}{2}$ – $\frac{3}{4}$ as long as the outer bract; roots tuberous 3. *djurensis*

Outer bract only a little longer than the inflorescence, densely pilose; stems very flexuous, angular when dry, densely pilose; leaves linear, about 5 cm. long 4. *Mannii*

Leaf-sheaths shortly and softly hirsute; stems straight; leaves linear, 6–10 cm. long; outer bract twice as long as the inflorescence 5. *Deightonii*

Internodes glabrous:

Stems purplish, prostrate or ascending; bracts purplish, the outer not recurved; leaves linear, up to 5 cm. long, glabrous 6. *rubescens*

Stems erect, not purplish; heads pedunculate, subtended by one bract about twice as long as the head; bracts nerved and minutely scaberulous 7. *scaberula*

Roots from a bulb-like stock:

Outer bract at most twice as long as the inflorescence; bulb-like base of stem ovoid, the scales densely appressed-villous; leaves linear, acute, subradical, 15–20 cm. long, 6–8 mm. broad, glabrous; inflorescences few and subumbellate; bracts lanceolate, pubescent 8. *bulbifera*

Outer bract 3–4 times as long as the inflorescence, acute, about 4 cm. long, pilose; scales of bulb-like base nearly glabrous; leaves narrowly linear, with an acute hairy tip, 8–9 cm. long, pilose; inflorescence solitary or 2–3 in an umbel; bracts lanceolate, very acute 9. *angusta*

1. *Cyanotis caespitosa* Kotschy & Peyr.—F.T.A. 8: 82. *Zygomenes caespitosa* Kotschy & Peyr. Pl. Tinn. t. 22A. A perennial herb with blue or red flowers often appearing after burning.

- French Sudan: Gourma (July)! French Guinea: Diaguissa (Apr.)! N. Nigeria: Nupe! Bauchi Plateau (Jan.)! Sokoto (June)! Katagum! near Zaria (Apr.)! Also in E. Sudan and Angola. Exsicc.—Barter 3440. Lely P. 82. Ryan 23. Dalz. 334; 542. Chev. 12940; 24395. (See Appendix).

2. *C. lanata* Benth.—F.T.A. 8: 80, incl. vars.; Chev. Bot. 670. *C. caespitosa* A. Chev. Bot. 670, not of Kotschy and Peyr. A common woolly herb with clusters of light blue, pink or white flowers, in wet places sometimes on rocks.



FIG. 287.—*CYANOTIS BULBIFERA* Hutch. (COMMELINACEAE).

A, showing habit with bulb-like base (in section). B, flower. C, stamen. D, pistil. E, open capsule. F, seeds.

- From French Guinea to N. and S. Nigeria, and general throughout tropical Africa. Exsicc.—*Collenette* 74. *Dawe* 558. *Chev.* 2587; 18271; 21712, etc. *Anderson* 16. *Barter* 1475. *Dalz.* 256a; 257; 808; 1286. *Lely* 280. *Vogel* 183. *Millen* 100. (See Appendix).
3. *C. djurensis* C.B.Cl.—F.T.A. 8: 82.
French Sudan: Gourma, Konkobiri (July)! Also in S.E. Sudan. Exsicc.—*Chev.* 24330.
4. *C. Mannii* C.B.Cl.—F.T.A. 8: 83. *C. rubescens* var. A. *Chev.* Bot. 670. A softly pilose herb with clusters of blue flowers.
Ivory Coast: Baoulé Nord (July)! S. Nigeria: Above Bamenda, 6,500 ft.! Cameroons Mt.: 7,000–10,000 ft.! Buea! Fernando Po: Clarence Peak, 9,000 ft. (Dec.)! Exsicc.—*Chev.* 22196; 22197. *Johnston* 34. *Mann* 616; 1310; 2140. *Maitland* 829. *Preuss* 79; 800. *Migeod* 154; 181; 417.
5. *C. Deightonii* Hutch. in Kew Bull. 1936: ined. Common herb 3 ft. high in grassy places; flowers blue.
Sierra Leone: Freetown (Oct.)! Exsicc.—*Deighton* 43.
6. *C. rubescens* A. *Chev.* in Bull. Soc. Bot. France 58: Mém. 8: 216; Bot. 670. Stems sometimes rooting at the nodes, purplish; leaves often nearly black; flowers blue.
French Sudan: Mossi (Aug.)! French Guinea: Futa Jallon (Sept.)! Sierra Leone: Foni Flats (Oct.)! Konta (Aug.)! Ivory Coast: Middle Sassandra (July), etc.! Exsicc.—*Chev.* 18237; 21812; 22196; 24769. *Deighton* 1260; 2167. *Thomas* 1951.
7. *C. scaberrula* Hutch. in Kew Bull. 1936: ined. Like the last but subtending bracts solitary and not in subopposite pairs; leaves few and linear, very acute; numerous tuberous roots.
French Guinea: Kouroussa (May)! Exsicc.—*Pobéguin* 258; 368.
8. *C. bulbifera* Hutch. in Kew Bull. 1936: ined. A slender herb with a silky villous bulb.
French Sudan: Sikasso (Apr.)! Couroula (Apr.)! Ivory Coast: Orodougou (June)! Dahomey: Atacora Mts., 1,300–1,700 ft. (June)! N. Nigeria: Sokoto, abundant! Exsicc.—*Chev.* 730; 747; 21813 bis; 23959; 24016; 24085.
9. *C. angusta* C.B.Cl.—F.T.A. 8: 79. A herb about 6 in. high with a small bulb-like stock, in rocky soil; flowers blue; filaments plumose.
French Guinea: Futa Jallon; between Kérébéleya and Timbo, 1,800–2,000 ft. (Sept.)! N. Nigeria: Nupe! Bauchi Plateau (July)! Exsicc.—*Barter* 1476. *Lely* P. 377. *Chev.* 18326.

8. COMMELINA Linn.—F.T.A. 8: 33.

*Spathe-margins free in the lower part:

Spathes 2–3 times as long as broad (when folded), acutely long-acuminate:

Seeds reticulate:

Flowers blue; leaves linear-lanceolate, gradually narrowed into the basal sheath, 10–15 cm. long, 1–1.5 cm. broad, glabrous; basal sheath long-ciliate towards the apex; flowers exerted from the spathe, the one-flowered peduncle pubescent below the articulation and longer than the other; sepals ovate, 6–7 mm. long

1. *macrospatha*

Flowers yellow 5. *africana*
Seeds smooth except for the embryostega and a narrow keel; leaves broadly linear-lanceolate, gradually acuminate, narrowed to the basal sheath, 6–13 cm. long, 1–5 cm. broad, shortly and scantily pubescent on both sides; flowers exerted; sepals 4–5 mm. long; spathes ovate, long-beaked-acuminate, 5 cm. long

2. *Thomasii*

Spathes not much longer than broad (even when folded), not or only shortly acuminate
Leaves ovate or broadly ovate-lanceolate, rarely more than twice as long as broad; flowers blue:

Leaf-blade rounded at the base and subsessile on the sheath, ovate, not acute, 3–4 cm. long, 1.5–2 cm. broad, closely pitted below, scabrid-ciliate on the margin; leaf-sheath glabrous outside, ciliate on the margin; spathe shortly stalked, about 1.3 cm. long 3. *Mannii*

Leaf-blade more or less stalked on the sheath, broadly lanceolate, acute, 5–6 cm. long, 2–3.5 cm. broad, glabrous; spathe broadly ovate to ovate-lanceolate, shortly acuminate; flowers blue, much exerted from the spathe; seeds strongly reticulate 4. *nudiflora*

Leaves lanceolate to linear, three or more times as long as broad; flowers yellow or yellowish-white:

Leaves broadly lanceolate to linear-lanceolate:

Leaves and spathes without visible transverse nerves; spathes solitary, ovate or ovate-lanceolate, markedly ciliate in the lower part; flower long-exserted from the spathe 5. *africana*

Leaves and spathes with distinct transverse nerves; spathes more or less capitate and often clothed with crimson bristles; leaf-sheaths with long bristles at the top; leaves shortly pubescent on both surfaces; flower only slightly exerted from the spathe; seeds transversely ridged and deeply pitted on the back

6. *capitata*

Leaves linear:

Spathes shortly stalked, 1.3–1.5 cm. long, setose-pilose outside; seeds very reticulate, rounded; leaves 6–10 cm. long, thinly pilose-setose above or glabrous

7. *Gambiae*

Spathes as above; seeds oblong, nearly smooth, but with 2 pits on the back

16. *umbellata*

Spathes subsessile, glabrous outside, sharply reflexed, ciliate; seeds coarsely warted; leaves 8–10 cm. long, glabrous; lower leaf-sheaths pectinate-ciliate

8. *subulata*

**Spathe-margins connate in the lower part and forming a wide funnel-shaped tube:

Leaf-margins strongly undulate and cartilaginous; blades oblong-lanceolate, 3.5–4 cm. long, shortly narrowed into the broad membranous sheath; spathes 1.3 cm. long, glabrous or pilose outside; flowers shortly exserted; seeds slightly reticulate

9. *Forskalaesi*

Leaf-margins not undulate:

Leaves lanceolate (not linear) to ovate or ovate-elliptic:

Seeds transversely ridged and reticulate or angular, oblong:

Leaves ovate or ovate-lanceolate, acute or acutely acuminate, 4–7 cm. long, 2.5 cm. broad, thinly pubescent on both sides, the stalk and sheath more or less bristly with long brown hairs; spathe about 1.5 cm. long .. 10. *benghalensis*

Leaves lanceolate, gradually pointed and acute, shortly petiolate on the sheath, 6–12 cm. long, 1.5–2.5 cm. broad, glabrous; sheath slightly ciliate but otherwise glabrous; spathe 2 cm. long, acute, thinly setose-pilose outside .. 11. *Vogelii*

Seeds smooth:

Leaves glabrous below, lanceolate, very acute, 6–12 cm. long, 2–3.5 cm. broad; sheath glabrous or pilose outside, finely long-ciliate; spathe about 2.5 cm. long, glabrous outside; flower shortly exserted .. 12. *congesta*

Leaves pilose or pubescent below:

Leaves acutely acuminate, lanceolate or ovate-lanceolate, sessile on the sheath, 7–8 cm. long, 2.5–3 cm. broad; sheaths with scattered long weak hairs outside .. 13. *condensata*

Leaves acute but scarcely acuminate, ovate-elliptic, subsessile on the sheath, 4–6 cm. long, 1.5–3 cm. broad, thinly pilose-pubescent on both surfaces .. 14. *lagosensis*

Leaves linear or narrowly linear-lanceolate:

Peduncle longer than the spathe, pubescent; leaf-blade sessile and auriculate on the sheath, about 15 cm. long and 1–1.3 cm. broad, thinly setulose-pubescent on both surfaces, 5–7-nerved; spathe broadly ovate, acute, 2–5 cm. long, setulose outside; leaf-sheaths about 3 cm. long .. 15. *lateriticola*

Peduncle shorter than the spathe:

Stems not dwarf:

Whole plant thinly pubescent; roots thin and fibrous; spathes with a recurved beak, about 1.5 cm. long, only slightly hispid .. 16. *umbellata*

Whole plant densely pilose; roots thickened; spathes shortly pedunculate, obliquely triangular, not recurved, 2 cm. long, long-hispid .. 17. *piolosissima*

Stems dwarf, about 8 cm. long; leaves crowded, about 8 cm. long; spathes much recurved, acuminate, about 1.5 cm. long, thinly setose-pilose; roots fibrous; seeds with a horse-shoe shaped callus nearly all around, otherwise smooth .. 18. *aspera*

1. *Commelina macrospatha* Gilg & Lederm. ex Mildbr. in Notizbl. Bot. Gart. Berl. 9: 253. Herb 12–18 ins, high with bright blue flowers exserted from the pointed spathe.
French Guinea: Kollangui pools (Mar.)! N. Nigeria: Munshi country (June)! Bauchi Plateau (May)! Naraguta (June)! Also in French Cameroons. Exsicc.—Dolz. 803. Lely 328; 496; P. 290. Chev. 12983.
2. *C. Thomasii* Hutch. in Kew Bull. 1936: Ined.
Sierra Leone: Yonibana (Nov.)! Exsicc.—Thomas 5205.
3. *C. Mannii* C.B.Cl.—F.T.A. 8: 48. Stems slender with scattered leaves; leaf-sheaths hirsute on the margin. Cameroons Mt.: 7,000 ft., (Dec.)! Exsicc.—Mann 2136.
4. *C. nudiflora* Linn.—F.T.A. 8: 36; Stapf 659; Holl. 711.
Very common in most warm countries. Exsicc.—Vogel 11. Deighton 2415. Sc. Elliot 3875. Linder 324; 476. Lely P. 261; P. 549. Dolz. 1287; 8203. Mann 2137. Migeod 437. (See Appendix).
5. *C. africana* Linn.—F.T.A. 8: 45; Chev. Bot. 662, partly. *C. bakueana* A. Chev. Bot. 663, name only. *C. krebsiana* var. *villosior* A. Chev. Bot. 664, not of C.B.Cl. *C. Elliotii* C.B.Cl.
Sierra Leone: Lokko! Makuta, 3,400 ft. (June)! near Kasokora (Aug.)! Ivory Coast: Tarmodi (Aug.)! Oubi country! Gold Coast: Kwahu (Mar.)! N. Nigeria: Neill's Valley, near Naraguta (June)! Bauchi Plateau (June)! S. Nigeria: above Bamenda (Jan.)! Widely spread in tropical and South Africa and the Mascarenes. Exsicc.—Sc. Elliot 5749. Thomas 477. Deighton 1261. Johnson 647. Lely 263; 372; P. 323; P. 328; P. 546. Chev. 19325; 22394.
6. *C. capitata* Benth.—F.T.A. 8: 54; Chev. Bot. 663; Stapf 659. *C. africana* A. Chev. Bot. 662, partly. A straggling herb up to 2 ft. high; spathes and leaf-sheaths with long purplish bristles.
French Guinea: Diendion! Casamance! Dalaba-Diaguissa Plateau, etc.! Sierra Leone: Samu country! Kenema! Ronietta! Njala! Liberia: Cape Palmas! near Kakatow! Dukwal R.! Ivory Coast. Gold Coast: Tunifa-Aklim! Dahomey: Porto-Novo circle! S. Nigeria: various locs.! Cameroons Mt.! Fernando Po! Also in East Africa and south to Angola. Exsicc.—Smeathman. Perrottet. Chev. 18777; 22900. Sc. Elliot 4080. Deighton 387; 1776. Thomas 5667. Vogel 52. Cooper 32. Linder 1120; 1243. Johnson 256. Kennedy 419. Talb. 910. Holland 125. Kalbreyer 17. Mann 91. Pöbguin 1875.
7. *C. Gambiæ* C.B.Cl.—F.T.A. 8: 38. A weak lanky herb with long internodes and very narrow leaves; spathes recurved, 2 in. long; flower shortly exserted.
Senegal! Gambia! Sierra Leone: Bonthe Island (Nov.)! Newton (Nov.)! Liberia: Monrovia (Nov.)! N. Nigeria: Zungeru (Aug.)! Exsicc.—Heudelot 577. Ingram. Hayes 578. Deighton 1482; 2286; 2316. Dolz. 264. Moiser 171. Linder 1523.
8. *G. subulata* Roth—F.T.A. 8: 38. Up to 1 ft. high, rooting at the lower nodes; spathes subsessile; flowers blue or brownish.
N. Nigeria: Katagum! Naraguta (June)! Bauchi Plateau (July)! Schoa (Aug.)! Widely spread in East Africa and in South Africa; also in Southern India. Exsicc.—Dolz. 229. Lely 274; 404; P. 548. P. 550. Vogel 53.
9. *C. Forskalaesi* Vahl—F.T.A. 8: 44. Flowers bright blue; leaves with very wavy thickened margins.
Mauritania! French Guinea: Kouroussa! Senegal: Richard Tol! Gold Coast: Northern Territ., common weed! Dahomey: Cotonou! N. Nigeria: Nupe! Sokoto! Katagum distr., common in



FIG. 288.—*COMMELINA NUDIFLORA* Linn. (COMMELINACEAE).

A, flower. B, stamens. C, staminode. D, capsule. E, two valves of capsule showing seeds. F, seeds. G, upper (left) and lower (right) surface of leaf.

- waste ground! Widely distributed in tropical Africa, through Arabia to S. India; Mascarenes. Exsicc.—*Heudelot* 276. *Roger* 93. *Chev.* 22698. *Charles* in *Herb.* *Chev.* 28820. *Pobéguin* 464. *Barter* 1477. *Dalz.* 232. (See Appendix).
10. *C. benghalensis* Linn.—F.T.A. 8: 41, incl. var. *hirsuta* C.B.Cl.
A common weed from French Guinea to Nigeria, ascending to 5,000 ft. on Cameroons Mt., and in other parts of Africa; generally distributed in the warmer regions of the Old World. Exsicc.—*Chev.* 20956. *Sc. Elliot* 4250. *Thomas* 3913; 3915. *Irvine* 849. *Warnecke* 276. *Baummann* 413. *Dalz.* 231; 265; 809. *Lely* P. 791. *Talb.* 759. *Dunlap* 141. *Linder* 1177; 1559. (See Appendix).
11. *C. Vogelii* C.B.Cl.—F.T.A. 8: 56. *C. guineensis* Hua. Flowers blue or white.
Senegal! French Guinea: Kouroussa! Sierra Leone: Bumbuna! Ivory Coast: Baoulé-Nord (July)! Gold Coast: Kwahu (May)! Accra (May)! N. Nigeria: various locs.! S. Nigeria: Lagos! Fernando Po! Extends to E. Africa and Angola. Exsicc.—*Heudelot* 476. *Thomas* 3813. *Chev.* 22033; 22064. *Pobéguin* 355. *Dalz.* 304. *Lely* 313. *Dennett* 480. *Vogel* 261. *Paroisse* 195.
12. *C. congesta* C.B.Cl.—F.T.A. 8: 43. *C. amphibia* A. Chev. Bot. 662. Leaf-sheaths glabrous or nearly so; often in water; flowers white or blue.
Senegal! Gambia! Sierra Leone: Njala (Oct.)! Ivory Coast: several localities! N. Nigeria: Katagum! Bauchi Plateau (May)! S. Nigeria: Agui, near Ilorin! Cameroons Mt.: above Buea, in forest, 4,000 ft. (Oct.)! Also in Gabon. Exsicc.—*Heudelot* 788. *Deighton* 1344. *Hayes* 556. *Chev.* 22411. *Migeod* 86. *Dalz.* 230. *Lely* P. 316. *Thornton*.
var. *hirsuta* Hutch.—*C. amphibia* var. *hirsuta* A. Chev. Bot. 663. Leaf-sheaths pilose.
Ivory Coast: Togo Country (July)! Exsicc.—*Chev.* 19597.
13. *C. condensata* C.B.Cl.—F.T.A. 8: 43.
French Sudan: Gourma (July)! S. Nigeria: common weed of waste places at Lagos (Jan.)! Fernando Po! Exsicc.—*Mann* 91 (partly). *Dalz.* 1288. *Chev.* 24348.
14. *C. lagosensis* C.B.Cl.—F.T.A. 8: 57. *C. lagosensis* var. *subglabra* A. Chev. Bot. 664. *C. Zenkeri* A. Chev. Bot. 665, not of C.B.Cl.
Ivory Coast: various localities! Togo: near Lome! S. Nigeria: Lagos! Exsicc.—*Warnecke* 281. *Millen* 21. *Dalz.* 1418. *Chev.* 21544, etc.
15. *C. lateritica* A. Chev. in Bull. Soc. Bot. Fr. 58: Mem. 8: 215 (1912).
French Guinea: Pitor! Futa Jallon; Dalaba-Diaguisa Plateau, 3,000–4,000 ft. (Sept.–Oct.)! N. Nigeria: Bauchi Plateau (Aug.)! Exsicc.—*Chev.* 18821. *Pobéguin* 2105. *Lely* P. 666.
16. *C. umbellata* Thonn.—F.T.A. 8: 55. *C. gourmaca* A. Chev. Bot. 664, name only. *C. gourmaensis* A. Chev. About 1 ft. high; stems slender, with long internodes; leaves few, linear; flowers pale blue.
French Sudan: several localities! French Guinea: Kairia! Timbo! Gourma! Dalaba-Diaguisa Plateau! Ivory Coast: Baoulé-Nord Circle (July), etc.! N. Nigeria: Nupe, in cultivated soils! Lokoja! Abinsi (Oct.)! Bauchi Plateau (July)! S. Nigeria: Attah! Aguku distr.! Exsicc.—*Thomas* 652; 1788. *Chev.* 22063; 24467. *Pobéguin* 1874. *Elliott* 190. *Dalz.* 801. *Lely* P. 534. *Vogel* 85.
17. *C. pilosissima* Hutch. in Kew Bull. 1936: ined.
Ivory Coast: Sassandra valley; Orodougou (June)! Exsicc.—*Chev.* 21826.
18. *C. aspera* Benth.—F.T.A. 8: 56.
Gold Coast: Accra! N. Nigeria: Confluence of Niger and Benue rivers! Benue R.! Munchi country! Exsicc.—*Vogel*. *Don.* *Talb.* 762. *Dalz.* 805.

Imperfectly known species.

Scott Elliot 5164, referred by C. B. Clarke to *C. Schweinfurthii* C.B.Cl., is scarcely that species, but the material is insufficient for description; *Scott Elliot* 5385 is the same; apparently very near *C. Livingstonii* C.B.Cl. from S. Trop. Africa.

9. POLYSPATHA Benth.—F.T.A. 8: 61.

Leaves glabrous, subrhomboid-elliptic, acutely acuminate, cuneate at the base, 10–15 cm. long, 4–6 cm. broad, with very faint transverse veins; leaf-sheaths 1.5–2 cm. long, shortly pubescent outside; inflorescence a panicle nearly as long as the leaves; axes clothed with short hooked hairs, very zigzag, with the broadly ovate spathes reflexed and about their own length apart, the spathes about 1 cm. long, very shortly pubescent on the margin; capsule 5 mm. long, shining; seeds with radiating ribs

1. *paniculata*

Leaves glabrous, etc., as above, but narrower and very glaucous; inflorescences mostly solitary and shorter than the leaves; stems rooting at the nodes. . . 2. *glaucescens*

Leaves usually pilose, narrowly oblong-elliptic or elliptic, acutely acuminate, cuneate and shortly stalked at the base, 10–13 cm. long, 2.5–4.5 cm. broad; leaf-sheaths 1.5 cm. long, pubescent or pilose outside; inflorescence a dense short cluster, the axes clothed with S-shaped hooked hairs, zigzag; spathes reniform-suborbicular, about half their own length apart, about 8 mm. long, clothed with long weak hairs on the margin; capsule 3 mm. long 3. *hirsuta*

1. *Polyspatha paniculata* Benth.—F.T.A. 8: 61; Chev. Bot. 666, partly. A herb up to 2 ft. high in moist shady woods, rooting at the lower nodes, with a cluster of zigzag inflorescences at the top; flowers white.
French Guinea: Kouria! Sierra Leone: Scarles (Jan.)! Maboul (Nov.)! Gold Coast: Akim Hills (Dec.)! Achimota! Kumasi! N. Nigeria: Sapoba! Oban! Likomba! Fernando Po! Extends to Gabon and in Uganda. Exsicc.—*Caville* in *Herb.* *Chev.* 14894; 16569; 16687; 16737; 19397. *Sc. Elliot* 4678. *Thomas* 3515. *Johnson* 250. *Irvine* 875. *Talb.* 748. *Preuss* 1186. *Barter* 1475; 2055. *Vogel* 93. *Millen* 4. *Mildbr.* 10530.
2. *P. glaucescens* Hutch. in Kew Bull. 1936: ined. *P. paniculata* var. *glaucescens* C.B.Cl. in DC. Monogr. 3: 135. *P. paniculata* A. Chev. Bot. 666, partly, not of Benth. Similar to the preceding.
Ivory Coast: Morénou (Dec.)! Cameroons Mt.: 3,000 ft. (Dec.)! Fernando Po: 2,000 ft.! Exsicc.—*Mann* 2138. *Chev.* 22470.
3. *P. hirsuta* Mildbr. in Notizbl. Bot. Gart. Berl. 9: 256, incl. var. *togoensis* Mildbr. l.c. 257. *P. paniculata* A. Chev. Bot. 666, partly, not of Benth. Flowers yellow.
Ivory Coast: Between Kouroukoro and Touna (May)! Gold Coast: Akokoaso (Nov.)! Togo: Atakpame (Nov.)! N. Nigeria: Mt. Patti (Nov.)! S. Nigeria: Otto! Also in Cameroons and Uganda. Exsicc.—*Chev.* 14719; 16550; 16778 bis; 16868; 21796. *Fishtock* 70. *Mildbr.* 7452. *Dalz.* 254. *Millen* 7; 26.

156. FLAGELLARIACEAE

Erect or climbing. Leaves sometimes ending in a tendril; leaf-sheath embracing the stem, closed. Flowers hermaphrodite or dioecious, in terminal

panicles. Perianth persistent, segments 6, 2-seriately imbricate, dry or somewhat petaloid. Stamens 6; anthers 2-celled, introrse, opening lengthwise by slits. Ovary superior, 3-celled; style 3-lobed. Ovules solitary in each cell, spreading or pendulous from the central axis. Fruit indehiscent, fleshy or drupaceous. Seeds with copious endosperm.

Tropics and subtropics of Old World.

FLAGELLARIA Linn.—F.T.A. 8: 90.

Flowers hermaphrodite; perianth subpetaloid, 2-seriate, the outer shorter; stamens 6; ovary 3-celled, with a solitary ovule in each cell; fruit a small berry.

A tall herbaceous climber; branches covered by the encircling leaf-sheaths, the latter deeply split on one side, glabrous, 1.5–3 cm. long; leaves linear-lanceolate, sessile on the sheath, with a slender tendriliform tip, 10–20 cm. long, 1.5–3 cm. broad, many- and closely-nerved, glabrous; flowers numerous, yellow, in a terminal panicle



FIG. 289.—*FLAGELLARIA GUINEENSIS* Schumacher (FLAGELLARIACEAE).

A, flower. B, anther. C, pistil. D, fruit. E, cross-section of fruit. F, fruits. G, portion of leaf showing lower surface.

6–10 cm. long; perianth-segments in 2 series, the outer half as long as the inner, subpetaloid; stamens 6, exserted; ovary glabrous, trigonous; fruit subglobose, mucronate, about 6 mm. diam., bright red *guineensis*

F. guineensis Schumacher—F.T.A. 8: 90; Chev. Bot. 672. A forest climber usually near rivers; fruits red in dense clusters.

Ivory Coast to Southern Nigeria, and tropical Africa generally; extends on the eastern side from Kenya coast forests to Pondoland. Exsicc.—Vogel 14. Irvine 453. Chipp 393. Vigne 1441. Warnecke 104. Dalz. 1416. Mann 425. Barter 20172. Chev. 15206; 16754. (See Appendix).

157. XYRIDACEAE

Perennial or annual herbs. Leaves mostly radical, tufted, linear, terete or filiform, sheathing at the base. Flowers hermaphrodite, slightly zygomorphic, arranged in pedunculate terminal globose to cylindrical heads; bracts imbricate, leathery or rigid, the lower sometimes forming an involucre. Sepals 3 or rarely 2, the lateral 2 exterior, boat-shaped, keeled, glumaceous, the third interior, membranous, forming a hood over the corolla and pushed aside as the latter develops. Corolla with a short or long tube and 3 equal spreading lobes. Stamens

3, opposite the corolla-lobes, and 3 alternate staminodes or the latter absent; anthers 2-celled, opening by slits. Ovary superior, 1-celled, with 3 parietal placentas or imperfectly 3-celled at the base; style simple or 3-lobed. Ovules numerous to few. Fruit a capsule enclosed in the persistent corolla-tube. Seeds numerous, with copious endosperm and small embryo.

Warm regions, usually in saline marshes; very numerous in Florida.

XYRIS Linn.—F.T.A. 8: 7.

Peduncle flattened and 2-edged or almost winged, without ribs between the edges:

Leaves flat and grass-like, up to 20 cm. long, about 3.5 mm. broad, glabrous; flower-heads 3 or 4 to each plant, globose or ellipsoid, over 6 mm. long; bracts broadly suborbicular, greenish-stramineous, with membranous margins and a hardened greenish keel towards the apex; lateral sepals hyaline, broadly oblanceolate, with a sharp hyaline entire keel; capsule 4.5 mm. long, 1 valve much broader than the others; seeds striate 1. *anceps*

Leaves very narrow and short, at most 8 cm. long and 2 mm. broad, glabrous; flower-heads 2-3 to each tuft of leaves, broadly campanulate, about 4 mm. long; bracts very broadly elliptic, reddish-purple, slightly emarginate, scarcely keeled; keel of lateral sepals smooth, entire; capsule 3.5 mm. long 2. *subrubella*

Peduncle more or less terete or if slightly 2-edged then with distinct ribs between:

Keel of lateral sepals quite smooth and entire:

Peduncle stout; involucre broadly campanulate, about 8 mm. long; bracts shining, orbicular-obovate, obtuse, scarcely keeled, brownish; leaves broadly linear, sometimes nearly as long as the peduncles; keel of lateral sepals winged 3. *capensis*

Peduncle filiform or very slender; involucre narrowly campanulate or ellipsoid:

Leaves linear, tufted at the base, up to 15 cm. long; peduncles several, up to 30 cm. long; bracts submucronate, dry and chaffy, slightly keeled 4. *straminea*

Leaves 1-2 cm. long; peduncles at most 8 cm. long; bracts subacute, shining, very slightly and narrowly keeled towards the apex 5. *minima*

Keel of the lateral sepals minutely ciliate:

Bracts without a distinct keel, brown when dry; leaves rather few, up to 10 cm. long; peduncles slender, up to 30 cm. long 6. *filiformis*

Bracts with a conspicuous callus-like keel at the apex, dark-brown when dry; leaves very narrow and often closely black-spotted; peduncles slender and wiry, purplish, about 45 cm. long 7. *Barteri*

Keel of the lateral sepals serrulate:

Peduncles very slender, ribbed-angular; bracts rather rigid, with a distinct sub-triangular area in the middle and slightly lacerate margins; leaves not seen 8. *angularis*

Peduncles rather stout and ribbed, very long; leaves grass-like, up to 45 cm. long, about 5 mm. broad; heads ovoid, about 2 cm. long; bracts broadly obovate-orbicular, with a clearly differentiated lanceolate-shaped 1-nerved middle area, margins slightly jagged 9. *decipiens*

1. *Xyris anceps* Lam.—F.T.A. 8: 12. A sedge-like herb of rice-fields or brackish swamps; leaves pale green, flowers yellow, in small heads on peduncles up to 3 ft. long.

Sierra Leone: Mahela (Dec.)! Kuntu, near Rokupra (Jan.)! Tombo (Jan.)! Pujehun (Dec.)! Mano Saliya (Dec.)! Ivory Coast: summit of Mt. Dou, 4,000 ft. (May)! S. Nigeria: Lagos! Ikoyi Plains (Nov.)! Tropical Africa generally, Natal, Mascarenes and French Guiana (not in Indo-Malaya). Exsicc.—*Sc. Elliot* 3981. *Deighton* 263; 282; 908; 992. *Barter* 20200. *Millen* 152. *Dalziel* 1278; 1279; 1428. *Heudelot* 562 (partly).

2. *X. subrubella* Malmé, ms.

3. *X. capensis* Lokoja, in marshy places (Nov.)! Exsicc.—*Dalziel* 240.

4. *X. filiformis* Thunb.—F.T.A. 8: 13.

Senegal! French Guinea: Kollangui (Mar.)! Futa Jallon (Oct.)! N. Nigeria: Bauchi (Jan.)! S. Nigeria: Bamenda, 4,000 ft. (May)! Tropical Africa generally and in S. Africa. Exsicc.—*Chev.* 12207 bis; 18713. *Lely* P. 16. *Maitland* 1525. *Leprieux*.

5. *X. straminea* Nils.—F.T.A. 8: 19. A small *Juncus*-like herb with a basal tuft of narrow leaves and several slender peduncles and small few-flowered heads; corolla yellow.

French Guinea: Kollangui (Mar.)! French Sudan: Sicoro (Jan.)! N. Nigeria: Nupe, Lom! Narguta (June)! Also in East and South Africa. Exsicc.—*Barter* 764. *Chev.* 231; 12216. *Lely* 282.

6. *X. minima* Steud.—F.T.A. 8: 25.

Senegal! French Guinea: Los Islands. Mali (Nov.)! Exsicc.—*Jardin* 120 (not seen). *Chev.* 34334. *Heudelot* 562 (partly).

7. *X. filiformis* Lam.—F.T.A. 8: 21. *Chev. Bot.* 660. Very like *X. straminea*.

Senegal! French Guinea: Konakry! Sierra Leone: Waterloo, in grassfields (Oct.)! Kotahun (Oct.)! Brookfields Golf Course! Bonthe Island (Nov.)! Also in Eastern Shari Region. Exsicc.—*Smeathmann. Lane Poole* 412. *Glanville* 17. *Deighton* 2139; 2288. *Pobéguin* 19; 1880.

8. *X. Barteri* N.E.Br.—F.T.A. 8: 22. Leaves few and very narrow and wiry; peduncles angular towards the top; bracts brown.

French Guinea! N. Nigeria: Nupe! Kontagora (Nov.)! Exsicc.—*Barter. Dalziel* 255. *Pobéguin* 1886.

9. *X. angularis* N.E.Br.—F.T.A. 8: 22. Peduncles long and wiry; leaves not seen.

Ivory Coast: Baoulé Sud; Toumodi distr. (Aug.)! N. Nigeria: Nupe! Exsicc.—*Barter* (no number). *Chev.* 23398.



W.E.T. DEL.

FIG. 290.—*XYRIS ANCEPS* Lam. (XYRIDACEAE).

A, flower-head. B, vertical section of flower. C, young fruit. D, open capsule. E, seed.

9. *X. decipiens* N.E.Br.—F.T.A. 8:22; Chev. Bot. 660, partly. A herb 2 ft. high in sandy moist places; flowers yellow in hard ovoid cone-like heads about 2 cm. long.
 French Guinea: Grandes Chutes (Dec.)! Diaguissa to Bonlivé! R. Bafing! Sierra Leone: Samu Country (Dec.)! Matamba-Manyakoi (Oct.)! Mano Sallia (Nov.)! Ivory Coast: Upper Cavally (Apr.)! S. Nigeria: Calabar! Also in Camerouns and Angola. Exsicc.—Sc. Elliot 4220. Glanville 29. Deighton 344. Chev. 14660; 20312; 20327; 21377. Robb. Smeathman.

158. RAPATEACEAE

Perennial herbs with a thick rhizome. Leaves radical, narrow, with parallel lateral nerves. Inflorescence scapose, capitate or unilaterally spicate. Flowers hermaphrodite, actinomorphic. Perianth double, the outer hyaline, lobes chaffy, rigid, imbricate, inner tubular, hyaline, lobes ovate, spreading, broadly imbricate. Stamens 6, inserted in the tube; anthers basifixed, cells confluent at the top and opening by 1 or 2 pores or by a terminal cleft. Ovary superior, perfectly or imperfectly 3-celled; style simple. Ovules few to solitary, basal or axile. Fruit a capsule, opening by valves septate in the middle. Seeds with copious mealy endosperm.

Liberia, and Tropical South America.

MASCHALOCEPHALUS Gilg & K. Schum.—F.T.A. 8:89.

A tufted herb with fibrous roots; leaves in a basal rosette, all in one plane, elongate linear-lanceolate, narrowed to a subobtuse apex, gradually contracted into the sheath at the base, up to 45 cm. long and 3 cm. broad, with a prominent midrib and several less prominent lateral parallel nerves, with distant faint cross-nerves between; sheath folded on each side of the sheath of the next leaf, winged on the back, about 12 cm. long; flower-head sessile in axils of the leaves; bracts 2, almost concealing the flowers; bracteoles several; perianth-tube slender, "about 4 cm. long"; lobes 6; stamens 6; anthers 5 mm. long, with a produced connective; capsule triangular

Dinklagesi

M. Dinklagesi Gilg & K. Schum.—F.T.A. 8:89.

Liberia: in a swamp at Fish Town, Grand Bassa! Between Kolobanu and Fayapulu, 80 miles up the St. Paul River (Oct.)! 8 miles west of Pehatah, beyond St. Paul River (Oct.)! Kada Town (Aug.)! Exsicc.—Dinklagesi 2087. Bequaert. Linder 342; 1002.

159. ERIOCAULACEAE

Perennial or rarely annual, with usually crowded narrow leaves. Flowers actinomorphic, capitate, numerous, small, unisexual, the males often mixed with the females or the males in the middle and the females around, very rarely the sexes in separate heads. Perianth scarious or membranous, segments in 2 distinct series, the outer free or rarely partially connate, the inner often stipitate and cupular, rarely absent. Stamens as many as or double the number of the perianth-segments and opposite to them; anthers 1-2-celled, opening lengthwise. Ovary superior, 2-3-celled; style lobed. Ovules solitary and pendulous in each cell. Fruit a membranous loculicidal capsule. Seeds solitary, pendulous; endosperm copious.

Mainly in swampy places in the tropics; a few in temperate regions.

Stamens double the number of the petals, 6 or 4, in two series; petals with a gland inside the apex:

Petals of both sexes of flowers free 1. *Eriocaulon*
 Petals of male flowers connate, of the female connate except at the base

2. *Mesanthemum*

Stamens the same number as the petals; petals not glandular:

Petals of the female flowers free 3. *Paepalanthus*
 Petals of the female flowers connate in the middle 4. *Syngonanthus*

1. ERIOCAULON Linn.—F.T.A. 8:231; Ruhland in Engl. Pflanzenr.

Eriocaulac. 30 (1903).

Involucral bracts radiating beyond the flowering part of the heads:

Peduncles only slightly exceeding the leaves:

Involucral bracts acute at the apex, gradually pointed, pale straw-coloured, 4-5 mm. long, shining; flowering bracts with a few short white hairs towards the apex;



FIG. 291.—*MASCHALOCEPHALUS DINKLAGEI* Gilg & K. Schum. (RAPATEACEAE).

A, flower with bract and bracteoles. B, stamen. C, same, from the back.

- leaves broadly linear, obtuse, about 3 cm. long and 3 mm. broad, becoming spongy when dry 1. *xeranthemoides*
- Involucral bracts rounded at the apex, 2.5–3 mm. long, pale straw-coloured, narrowly obovate; leaves narrowly lanceolate, acute, about 1 cm. long 2. *remotum*
- Peduncles 3–4 times as long as the leaves, very slender; involucral bracts white, broadly oblanceolate, about 3 mm. long; leaves about 1.5 cm. long, very acute; flowering bracts glabrous 3. *pumilum*
- Involucral bracts not radiating and not exceeding the flowering part of the heads: Flowering bracts glabrous (the heads then appear glabrous):
- Bracts pale brown or straw-coloured:
- Involucral bracts few:
- Involucral bracts lacerate-dentate at the apex; peduncles slender, up to 8 cm. long; leaves short and linear 4. *Heudelotii*
- Involucral bracts entire, acute; heads very small (3.5 mm.), globose; peduncles slender, about twice as long as the leaves; leaves tapered to the apex, up to 4 cm. long 5. *abyssinicum*
- Involucral bracts numerous, entire, the flowering bracts similar and very conspicuous: Bracts rounded at the apex; leaves rather thick, about 4 cm. long; flower-heads 4–5 mm. diam. 6. *fulvum*
- Bracts acutely pointed; leaves 4–6 cm. long; flower-heads 1 cm. diam. 7. *bongense*
- Bracts black or blackish, arranged in a very small compact head; leaves filiform; peduncles much longer than the leaves 8. *bistulosum*
- Flowering bracts pubescent or bearded in the upper part (the heads appearing pubescent):
- Leaves about 1 cm. broad; peduncles stout and stiff, usually overtopping the leaves; flowering bracts densely bearded with white hairs; involucral bracts in several rows, glabrous; flower-heads depressed-globose, about 1 cm. diam. 9. *latifolium*
- Leaves much less than 1 cm. broad; peduncles usually slender:
- Flowering bracts very shortly pubescent on the outside, with conspicuous acute triangular tips; peduncles long and slender, up to 30 cm. long; sheaths acute, 3–3.5 cm. long; leaves 2.5–5 cm. long, tessellated-reticulate when dry 10. *Azelianum*
- Flowering bracts hirsute with rough white hairs, especially on the margin:
- Heads not viviparous; female sepals glabrous:
- Peduncles several from each tuft of leaves, the latter very short and gradually tapered to a very acute apex, about 1 cm. long; heads globose, 8 mm. diam. 11. *plumale*
- Peduncles solitary from each tuft of leaves, stoutish, 30–35 cm. long; leaves thick and spongy, 3.5 cm. long with a blunt pore-like apex; heads depressed-globose, 1 cm. diam.; involucral bracts obovate, straw-coloured 12. *lactuum*
- Heads often viviparous; female sepals hairy inside and bearded with white hairs at the apex, with a broad thick very gibbous keel, blackish; leaves broadish towards the base, tapered to an obtuse apex, about 5 cm. long; peduncles elongated, becoming spirally twisted in the upper part 13. *zambesiense*

1. *Eriocaulon xeranthemoides* Van Heurck & Muell. Arg.—F.T.A. 8: 237. Flower-heads white; usually in drier parts of swampy ground.
Ivory Coast: Ano (Dec.)! N. Nigeria: near Fakum, Borgu! Kabba Road (Oct.)! Exsicc.—Barter 778. Parsons 1102. Chev. 22544.
2. *E. remotum* H. Lecomte in Bull. Soc. Bot. France 55: 643.
French Guinea: Futa Jallon: Dalaba-Diaguissa Plateau 3,400–4,000 ft. (Oct.)! Sierra Leone: Brook fields, Fossi flats, on bare rock (Oct.)! Exsicc.—Deighton 1778. Chev. 18310.
3. *E. pumilum* Afzel. ex Körnicke.—F.T.A. 8: 237; Ruhland in Engl. Pflanzenr. Eriocaulac. 97. *E. pulchellum* Koern. *E. Kindiae* Lecomte.
French Guinea: Pita and neighbourhood, on rocks near Konbi R. (July)! Sierra Leone: Waterloo, in grassy meadows where water trickles over bare rocks (Aug.)! Kenya (Oct.)! Matabele (Oct.)! Hills near Bumban, 1,000 ft., wet places on granite outcrop (Aug.)! Exsicc.—Afzelius. Deighton 1306; 2054. Thomas 2957. Glanville 21. Pobeguini 1359 bis; 2276.
4. *E. Heudelotii* N.E.Br.—F.T.A. 8: 258; Ruhland in Engl. Pflanzenr. Eriocaulac. 113.
Senegal: Tambacouda (Nov.)! Exsicc.—Heudelot 677. Chev. 33988; 34011.
5. *E. abyssinicum* Hochst.—F.T.A. 8: 257. Tiny herb 4 in. high, with small white heads.
N. Nigeria: Bauchi Plateau, in running water on rocks (Oct.)! Also in Abyssinia and S. Africa. Exsicc.—Lely P. 786.
6. *E. fulvum* N.E.Br.—F.T.A. 8: 243; Ruhland in Engl. Pflanzenr. Eriocaulac. 101.
N. Nigeria: Nupe! Exsicc.—Barter.
7. *E. bongense* Engl. & Ruhland.—F.T.A. 8: 246; Ruhland in Engl. Pflanzenr. Eriocaulac. 100.
Gambia: Kombo, in rice swamp! N. Nigeria: Nupe! Lokoja, in marshy places (Nov.)! Extends through the Shari district to the Eastern Sudan. Exsicc.—Dawe 23. Barter 1019A. Datz. 239.
8. *E. bistulosum* Van Heurck & Muell. Arg.—F.T.A. 8: 239; Ruhland in Engl. Pflanzenr. Eriocaulac. 90.
An almost submerged aquatic in swamps.
French Guinea: Bouria (Nov.)! Futa Jallon (Sept.)! Sierra Leone: John Obey (Mar.)! Ivory Coast: Baoulé Nord (Aug.)! N. Nigeria: Jeba, Nupe! Also in Eastern Sudan and Rhodesia. Exsicc.—Lane Poole 431. Barter 1021. Caille in Herb. Chev. 14958. Chev. 22251.
9. *E. latifolium* Smith.—F.T.A. 8: 243; Ruhland in Engl. Pflanzenr. Eriocaulac. 78. *E. Thunbergii* Wlkstr. *E. vittifolium* Lecomte. *E. Bonati* Lecomte. *Mesanthemum radicans* Stapf in Johnston Liberia 2: 662, not of Koernicke. Tufted, in running water; flower-heads white.
French Sudan: Boman (Mar.)! Sikasso (May)! French Guinea: Common in Futa Jallon! Kindia! stream near Konakry (Jan.)! Sierra Leone: "streams all over the country" (Jan.)! Liberia: near

- Kakatoen! Exsicc.—Chev. 524; 803. Dalz. 8247. Lane Poole 182. Dawe 407. Deighton 1031. Thomas 7879. Whyte. Pobéguin. Chev. 13121.
10. *E. Afzelianum* Wikstr. ex Koernicke.—F.T.A. 8: 250; Ruhland in Engl. Pflanzenr. Eriocaulac. 83. *E. kouroussense* Lecomte. A herb in moist sandy places or on bare rock. French Guinea; Grand Chutes (Dec.), etc.! Sierra Leone: Tombo (Jan.)! Brookfields (Oct.)! Materboi (Oct.)! Marshes near Kitchom (Dec.)! Ivory Coast: Ano (Dec.)! N. Nigeria: Nupe! Also in Eastern Sudan (acc. to Ruhland l.c.). Exsicc.—Pobéguin 615; 2181; 2206. Dawe 417. Deighton 1000; 2177. Glanville 20. Sc. Elliot 4339. Barter 1019. Chev. 20224; 22530; 25688; 34408.
11. *E. plumale* N.E.Br.—F.T.A. 8: 251; Ruhland in Engl. Pflanzenr. Eriocaulac. 106. *E. senegalense* N.E.Br. *E. rufum* Lecomte. *E. heterochiton* A. Chev. Bot. 687, partly, not of Koernicke. About 1 ft. high; sheaths at base of peduncles mauve-purple, about 5 cm. long. Senegal: Tambacounda (Nov.)! French Guinea: Kindia! Futa Jallon (Sept.)! Sierra Leone:

FIG. 292.—*MESANTHEMUM RADICANS* Koernicke (ERIOCAULACEAE).

- A, whole plant. B, leaf. C, flower-head and peduncle. D, flower-head. E, bracteole. F, bract. G, male-bud and stalked bracteole. H, part of female perianth from inside. I, pistil. J, cross-section of ovary. K, bracteole. L, male flower. M, male perianth with stamens.

- Wellington, wetter parts of grassy flats (Nov.)! Exsicc.—Heudelot 148; 680. Deighton 1867. Farmer 167a. Chev. 18419, partly; 18485; 33989. Pobéguin 1312; 2205; 2276.
12. *E. lacteum* Rendle.—F.T.A. 8: 245; Ruhland in Engl. Pflanzenr. Eriocaulac. 80. Peduncles elongated from a small tuft of leaves; sheath about 6 cm. long; heads white. N. Nigeria: Naraguta, boggy places (June)! Also in East tropical Africa, Rhodesia and Angola. Exsicc.—Lely 283.
13. *E. zambeziense* Ruhland.—F.T.A. 8: 252. Flowering stems up to 2 ft. long at length spirally twisted and often bearing a tuft of leaves in the middle of the head. S. Nigeria: Bamenda, Lakom, 6,000 ft., in a pond (June)! Also in Nyasaland. Exsicc.—Maitland 1400.

2. *MESANTHEMUM* Koernicke—F.T.A. 8: 260; Ruhland in Engl. Pflanzenr. Eriocaulac. 117.

Inner involucre bracts more than twice as long as the outer, resembling the ray-flowers of a Composite, about 1.5 cm. long, oblong-lanceolate, shortly pubescent outside; outer bracts ovate-elliptic, subappressed-pubescent outside; peduncles long and slender, about twice as long as the leaves, pubescent; leaves 6 mm. broad, thinly pubescent; tips of the flowering bracts glabrous. 1. *Prescottianum*

Inner involucre bracts not very markedly longer than the outer, with pubescent tips: Outer bracts whitish, shortly pubescent outside, broadly ovate-elliptic, rounded at the apex; peduncles up to $1\frac{1}{2}$ times as long as the leaves, glabrous; leaves up to 1.5 cm. broad, glabrous or slightly pubescent. 2. *radicans*

Outer bracts whitish, glabrous, broadly obovate, splitting at the tips; peduncles about 6 times as long as the leaves, pubescent only at the apex below the bracts; leaves about 1.5 cm. long, 3–4 mm. broad, ciliate towards the base; heads 6–7 mm. diam., the exerted perianths densely white-hirsute. 3. *albidum*

Outer bracts blackish, oblong, obtuse, 2.5 mm. long, scarious-ciliate on the margin, pilose outside; flowering bracts filiform, 4 mm. long, plumose; peduncles 4 times as long as the leaves, pilose; leaves 2–2.5 cm. long; heads 4–5 mm. broad; perianth-lobes long-pilose. 4. *auratum*

1. *M. Prescottianum* Koernicke in Mart. Fl. Bras. 3, 1: 472, t. 60, fig. 1.—F.T.A. 8: 261; Ruhland l.c. 118. *M. tuberosum* H. Lecomte. White, star-shaped flower-heads.

- French Guinea: Pita! Labe (Apr.)! Bilma (Sept.)! Sierra Leone: granite outcrop at Binkolo, and typical of such places (Aug.)! Exsicc.—*Herb. Lindley. Deighton 1277. Pöbéguin 2092. Caille in Herb. Chev. 15038; 34448.*
2. *M. radicans* Koernicke—F.T.A. 8: 261; Ruhland l.c. 119.
Usually in swampy places of coast districts from French Guinea to S. Nigeria and extending to Angola; also around Lake Victoria Nyanza. Exsicc.—*Pöbéguin 2037; 2209 bis.*
3. *M. albidum* H. Lecomte in Bull. Soc. Bot. Fr. 55: 601 (1909).
Much resembling *Eriocaulon*; small herb with very short leaves and slender peduncles with basal sheath about 2 cm. long; heads white, depressed globose, $\frac{1}{2}$ in. diam.
French Guinea: Kindia! Exsicc.—*Pöbéguin 1359.*
4. *M. auratum* Lecomte l.c. 599, fig. 1 (1909). A small herb with a few radical leaves and very slender pilose peduncles.
French Guinea: Frimagnbé. Exsicc.—*Pöbéguin 30.* Not seen in Paris, but inserted from Lecomte's description and figure; apparently a very distinct species.

3. PAEPALANTHUS Mart.—F.T.A. 8: 262; Ruhland in Engl. Pflanzenr.
Eriocaulac. 121.

Leaves densely pilose all over, very crowded into a dense cushion, recurved, about 1 cm. long; peduncles several, lateral to the cushion from the older leaves, very slender, about 1 cm. long, thinly pilose; heads monoecious, about 6 mm. diam.; involucre bracts ovate-triangular, pubescent on the margin *pulvinatus*

- P. pulvinatus** N. E. Br.—F.T.A. 8: 263; Ruhland in Engl. Pflanzenr. Eriocaulac. 221. A small cushion-plant with several shortly pedunculate heads from around the sides of the cushion.
Sierra Leone: probably Kissy! Exsicc.—*Bockstätt.*

4. SYNGONANTHUS Ruhland in Urban Symb. Antill. 1: 487 (1900)
(*Paepalanthus* auct. partly).

Leaves thinly pubescent or nearly glabrous, densely tufted, up to 3 cm. long; peduncles borne in the middle of the tuft of leaves, slender, up to about 20 cm. long, thinly pubescent; basal sheath with an oblique mouth; heads monoecious, about 6 mm. diam.; involucre bracts about 3-seriate, subacute, membranous and pale brown

Chevalieri

5. *Chevalieri* H. Lecomte in Bull. Soc. Bot. Fr. 55: 597. *S. Wahlbergii* Ruhland l.c. 247, partly. *Paepalanthus Wahlbergii* N. E. Br. in F.T.A. 8: 263, not of Koernicke.
N. Nigeria: Swamp near Lom, Nupe! Also in the Shari region and in East Africa. Exsicc.—*Barter 1539.*

160. MUSACEAE

Stems formed by the imbricate bases of the petioles, erect. Leaves spirally arranged, very large, with a thick midrib and numerous pinnately parallel nerves. Flowers mostly unisexual, clustered and subtended by large green spathaceous bracts, the male flowers within the upper bracts, the female within the lower. Calyx elongated, at first narrowly tubular, soon splitting on one side, variously toothed at the apex. Corolla more or less 2-lipped. Stamens 5, perfect, with a rudimentary sixth; filaments filiform; anthers 2-celled, the cells parallel and contiguous. Ovary inferior, 3-celled; ovules numerous, axile; style filiform, with a lobulate stigma. Fruit fleshy, indehiscent, 3-celled. Seeds with a thick hard testa and straight embryo in copious endosperm.

Tropics of the Old World.

MUSA Linn.—F.T.A. 7: 328; K. Schum. in Engl. Pflanzenr. Musac. 13 (1900).
Characters of the family.

Anthers at most 1.5 cm. long; perianth-segments of male flowers entire, limb 1.5 cm. long, apiculate; bracts shortly ovate-elliptic, about 20 cm. long and up to nearly as broad, very thin; leaves with very close, almost contiguous nerves; fruits oblong, acuminate, about 7 cm. long and 2 cm. broad, glaucous, closely nerved; seeds about 10 in a series, subglobose, smooth, 1 cm. diam. 1. *elephantorum*

Anthers 2–2.5 cm. long; perianth-segments of male flowers entire, limb about 2.5 cm. long, obtuse; bracts ovate-lanceolate, about 30 cm. long and 10 cm. broad, firm; leaves with somewhat spaced nerves; fruits (from Chevalier) 8–9 cm. long, about 3 cm. thick at the top, contracted and about 1 cm. broad at the base; seeds 7–8 mm. diam., black 2. *Schweinfurthii*

1. *M. elephantorum* K. Schum. & Warb. in Engl. L. 14.
This species may occur in the Cameroons Mt. area; it is recorded from the French Cameroons, from Boukollo Mt., near Yaounde.
2. *M. Schweinfurthii* K. Schum. & Warb. in Engl. L. *M. Chevalieri* Gagnep. *M. Martretiana* A. Chev., *M. Rüperii* A. Chev., and *M. sapientum* var. *gambicola* A. Chev. Bot. 632, names only.
According to Chevalier this species occurs from French Guinea through the savannah country to the basin of the Upper Nile; it is sometimes planted around villages in the upper parts of the Ivory Coast. (See Appendix).

161. ZINGIBERACEAE

Perennial herbs, usually aromatic, with horizontal tuberous rhizomes; stems sometimes very short, leafy or bearing only flowers. Leaves in two rows, with an open or closed sheath, sessile or stalked on the sheath, the blade usually large with numerous closely parallel pinnate nerves diverging obliquely from the midrib. Flowers solitary or in a distinct inflorescence accompanying or separate from the leaves, symmetric or asymmetric. Perianth 6-merous, 2-seriate, the outer calyx-like, the inner corolla-like and often very showy and delicate; outer segments united into a tube, inner more or less united, the posterior segment usually the largest. Stamen 1, with a 2-celled anther, sometimes accompanied by petaloid staminodes. Ovary inferior, 2-3-celled with axile placentas, or 1-celled with parietal or rarely basal placentas; style sometimes enveloped in a groove of the fertile stamen. Ovules mostly numerous. Fruit fleshy and indehiscent or a capsule. Seeds mostly arillate; endosperm abundant, white.

Tropics and subtropics.

Lateral staminodes rudimentary or suppressed:

Filament and connective of stamen not petaloid:

Flowers solitary or spicate, always borne separately from the leafy stems

1. *Aframomum*

Flowers paniculate, usually on the leafy stems 2. *Renealmia*

Filament and connective petaloid, bearing the anther in the middle 3. *Costus*

Lateral staminodes large and petaloid, forming the conspicuous part of the flower:

Anther-connective not spurred at the base; flowers in a lax cluster at the base of the plant 4. *Kaempferia*

Anther-connective 2-spurred at the base; flowers in a strobiliform inflorescence

5. *Curcuma*

1. **AFRAMOMUM** K. Schum. in Engl. Pflanzenr. Zingiberaceae 201 (1904). (*Amomum* Linn., partly.—F.T.A. 7: 302).

Leaves hairy on both surfaces or only below:

Leaves loosely pilose with rather long hairs:

Leaf-blade subsessile on the sheath, unequal-sided at the base, long-acuminate, nearly 30 cm. long and 5-6 cm. broad, laxly pilose on both surfaces, with a conspicuous stramineous midrib and very numerous parallel ascending nerves, densely ciliate; sheath pilose; inflorescences very short and clustered, 1-flowered

1. *pilosum*

Leaf-blade rounded into a distinct stalk on the sheath, unequal-sided at the base, long-acuminate, about 30 cm. long, 8-10 cm. broad, glabrous above, with very numerous ascending parallel nerves; sheaths softly pubescent; inflorescences as long or longer than the leaf-blade, few-flowered 2. *Elliotii*

Leaves shortly satiny-tomentellous below, glabrous above, elongate-oblong, subobtusate at the base, about 35 cm. long and 6 cm. broad, with very numerous crowded ascending parallel lateral nerves; ligule 6 mm. long, ribbed; leaf-sheath with conspicuous transverse veinlets; inflorescences short, 1-2-flowered, about 10 cm. long, with closely imbricate bracts; fruits narrowly obovoid, about 7 cm. long

3. *subsericeum*

Leaves glabrous below except sometimes on the midrib:

Leaves auriculate-cordate and sessile at the base at the junction with the sheath, elongate-oblong, acuminate, about 30 cm. long and 5 cm. broad, with numerous spaced ascending parallel nerves; sheath ribbed but without transverse veinlets; inflorescences much elongated, simple or branched at the top; bracts shortly overlapping; fruits with a long, persistent, tubular beak 4. *longiscapum*

Leaves at most rounded-subcordate at the junction with the sheath or false petiole:

Leaf-blade rather long-petiolate above the basal sheath:

Leaves elongate-oblancheolate, acutely acuminate, about 45 cm. long and 7 cm. broad, with numerous fine ascending lateral nerves; basal stalk 2.5-4 cm. long; ligule very large, deeply bipartite, about 3 cm. long, shortly pubescent; cluster of bracts about 12 cm. long; bracts broadly ovate, strongly ribbed; fruit ellipsoid, body about 3.5-4 cm. long, ending in a long persistent tube split on one side 5. *citratum*

Leaves oblong-elliptic, about 30 cm. long and 8-10 cm. broad, broadly rounded at the base, very thin; basal stalk 1-1.5 cm. long; ligule small, about 5 mm. long, glabrous; cluster of bracts 4-5 cm. long; bracts obscurely ribbed

6. *chlamydanthum*

Leaf-blade sessile or subsessile on the basal sheath :

Midrib of the leaves tomentose or tomentellous its full length on the lower surface :

Leaves with glabrous margins, gradually but acutely acuminate, 20–25 cm. long, 2.5 cm. broad, with very close parallel ascending lateral nerves ; inflorescences about 7 cm. long, several on a common peduncle ; bracts in about 5 tiers, increasing from the base upwards to about 4 cm. long, shortly ciliate

7. *Baumannii*

Leaves with shortly pubescent margins :

Leaves abruptly tailed-acuminate, narrowly elongate-oblong, about 25 cm. long and 2.5–3.5 cm. broad, with rather thick shortly pubescent margins ; inflorescences very short, with few imbricate ovate bracts .. 8. *limbatum*

Leaves gradually acuminate, rounded at the base, 15–20 cm. long, 5 cm. broad, reddish-brown when dry, with widely spaced parallel nerves ; ligule very small ; inflorescences paired, sessile, very short, with very broad rigid overlapping bracts ; young fruits with a long beak about 4 cm. long .. 9. *simiarum*

Midrib of the leaves glabrous below or shortly pubescent only towards the apex :

Peduncle rather long and slender, nearly as long as the leaf-blade, with the bracts in the lower half not or only slightly overlapping ; leaves oblong-oblongeolate, acutely acuminate, narrowed into a very short petiole ; ligule thin, usually not more than 1 cm. long ; inflorescence solitary, the upper bracts shortly ciliate 10. *granum-paradisi*

Peduncle short (much shorter than the leaf-blade) and with much overlapping bracts :

Leaves elongate-oblong, with parallel sides and very abruptly narrowed at each end, about 40 cm. long and 4–5 cm. broad. 11. *lycoarabis*

Leaves even when narrow with somewhat rounded sides and gradually narrowed to the base :

Fruits deeply sulcate, about 6 cm. long (without the beak) ; peduncle very short ; inflorescence very short, 1–2-flowered, the bracteate portion about 5 cm. long ; bracts shortly ciliate ; leaves oblong-lanceolate, acuminate, about 10 cm. long and 4–5 cm. broad ; seeds very shining .. 12. *sulcatum*

Fruits not sulcate (apart from natural shrinkage) :

Leaves very narrow (broadly linear), mostly about 2 cm. broad, bamboo-like in appearance, tailed-acuminate, with numerous close parallel nerves ; ligule short and rounded ; inflorescences very short, 1-flowered ; bracts rounded and mucronate ; fruits ovoid, beaked by the persistent calyx 13. *melegueta*

Leaves broader, oblong-elliptic or elongate-oblong-oblongeolate ; inflorescence usually more than 1-flowered :

Ligule conspicuous and membranous, 1–1.3 cm. long :

Leaves gradually narrowed to the base, about 30 cm. long and 5 cm. broad, with very close thickish nerves below ; bracteate part of inflorescence about 6.5 cm. long, about 3-flowered ; lip broadly obovate 14. *leptolepis*

Leaves abruptly rounded at the base, about 20 cm. long and 6 cm. broad, with rather divergent slender spaced lateral nerves ; inflorescence 1-several-flowered 15. *sceptrum*

Ligule inconspicuous, much less than 1 cm. long, somewhat rigid and leathery :

Labellum comparatively small and oblong-obovate, about 2 cm. broad, yellow ; peduncle short, simple or branched ; leaves rather large, about 30 cm. long and 7–10 cm. broad, with very close (almost contiguous) nerves below ; bracts few and about half overlapping .. 16. *Daniellii*

Labellum large and obovate, much broader than above, pink, pinkish-purple or white :

Nerves of the leaves very close and contiguous or nearly so ; leaf-blades 20–30 cm. long, 6–9 cm. broad ; fruits ovoid, beaked, 9–10 cm. long ; seeds oblong-ellipsoid, shining, 6 mm. long, with a yellow caruncle-like base 17. *latifolium*

Nerves of the leaves spaced, more than twice their own thickness apart :

Leaf-blades oblong or oblong-oblongeolate, rounded only towards the ends, 25–30 cm. long, 4–5 cm. broad ; inflorescences 2–3-flowered, short ; bracts closely imbricate 18. *Dalzielii*

Leaf-blades oblong-elliptic, rounded almost from the middle to ends, very shortly petiolate on the sheath ; inflorescences several-flowered ; bracts loosely imbricate 19. *cuspidatum*

1. *Aframomum pilosum* K. Schum. in Engl. Pflanzenr. Zingiberaceae 206. *Amomum pilosum* Oliv. & Hanb. —F.T.A. 7 : 307 ; Baker in Hook. Ic. Pl. t. 2483. A herb 6–8 ft. high, with very short bracteate 1-flowered inflorescences at the base of the stem ; petaloid staminode yellow.

S. Nigeria : Oban ! Fernando Po ! Exsicc.—Mann 1415. *Talb.* 83 ; 94.
2. *A. Elliotii* K. Schum. l.c. 217 ; Chev. Bot. 625. *Amomum Elliotii* Baker—F.T.A. 7 : 309. A herb in shady woods ; inflorescences from the base of the stem, stout, about 30 cm. long, with a cluster of vanilla-scented flowers at the top ; bracts on the peduncle about 2 in. long ; petaloid staminode white, yellowish in the throat ; fruits red.

- French Guinea: source of the Sassandra River, near Sahadougou (Mar.)! Sierra Leone: shady woods at Herimankuna (Mar.)! Exsicc.—*Sc. Elliot* 5249. *Chev.* 20872.
3. *A. subsericeum* K. Schum. l.c. 217. *A. glaucophyllum* K. Schum. *Amomum subsericeum* Oliv. & Hanb.—F.T.A. 7: 307; Baker in Hook. Ic. Pl. t. 2484. *A. glaucophyllum* K. Schum.—F.T.A. 7: 415. A herb with a creeping rhizome; leaves bluish white below; inflorescences very short, in a cluster at the base of the stem or disposed on a creeping shoot, about 2-flowered; bracts closely imbricate, gradually increasing from the base upwards; petaloid staminode magenta, 2½ in. diam.; fruits narrowly pear-shaped, 3 in. long.
4. *S. Nigeria*: Old Calabar! Barombi! Also in Gabon. Exsicc.—*Milne* (not seen). *Preuss* 554.
4. *A. longiscapum* K. Schum. l.c. 217; Stapf 655. *Amomum longiscapum* Hook. f.—F.T.A. 7: 310; Baker in Hook. Ic. Pl. t. 2481. A herb about 5 ft. high with elongated inflorescences from the base of the stem; bracts shortly overlapping on the peduncle and about 2 in. long; flowers few in a terminal cluster, the petaloid staminode white or pink.
- Sierra Leone: Regent, in the bush (Dec.)! Jagwema, Konno (July-Aug.)! Exsicc.—*Daniell* 3. *Dawe* 540. (See Appendix).
5. *A. citratum* K. Schum. l.c. 214; Chev. Bot. 625. *Amomum citratum* Pereira—F.T.A. 7: 308; Baker in Hook. Ic. Pl. t. 2478. *A. macrolepis* K. Schum.—F.T.A. 7: 306. A herb 10 ft. high; inflorescence short and almost globose with large imbricate bracts; petaloid staminode pink, about 3 in. diam.
- French Guinea: Guerze's country (Mar.)! S. Nigeria: Oban! Barombi (Mar.)! Also in Gabon. Exsicc.—*Talb.* 90. *Preuss* 5. *Chev.* 20943.
6. *A. chlamydanthum* Loes. & Mildbr. in Notizbl. Bot. Gart. Berl. 10: 706. Flowers yellowish.
8. *S. Nigeria*: Likomba Plantation, north-east from Victoria, in rain-forest (Nov.)! Exsicc.—*Mildbr.* 10712.
7. *A. Baumannii* K. Schum. l.c. 220. *A. aceleratum* A. Chev. Bot. 626, name only. Flowers carmine red; leafy stem about 6 ft. high; bracts increasing in size upwards.
- Togo: Misahöhe, in shady bush (June)! Dahomey: Atacora Mts., Somba Country, 1,200–1,800 ft. (June)! Exsicc.—*Chev.* 24210. *Baumann* 106.
8. *A. limbatum* K. Schum. l.c. 215. *Amomum limbatum* Oliv. & Hanb.—F.T.A. 7: 307; Baker in Hook. Ic. Pl. t. 2480. A herb 12–15 ft. high, with creeping rhizome and short bracteate inflorescences; calyx white; petaloid staminode light purple.
- Fernando Po: all through the forest (Dec.)! Exsicc.—*Mann* 99; 1171.
9. *A. simiarum* A. Chev. Bot. 626, and in Bull. Soc. Bot. Fr. 61: Mem. 8: 303. Leafy stems about 3 ft. long or more; inflorescences paired, sessile, very short; immature fruits smooth.
- Ivory Coast: Middle Cavally; Kéta (July)! Exsicc.—*Chev.* 19346.
10. *A. granum-paradisii* K. Schum. l.c. 213. *Amomum granum-paradisii* Linn., partly; F.T.A. 7: 304, with syn.; Hook. Bot. Mag. t. 4603; Holl. 661. *Aframomum cereum* K. Schum. *A. rostratum* K. Schum. *Amomum cereum* Hook. f.—Bak. in Hook. Ic. Pl. t. 2477; F.T.A. 7: 309. Leafy stems up to 4 ft. high; inflorescence up to 1½ ft. long, with partly imbricate bracts; ligule short or rather long and membranous; fruits glabrous, dark red.
- Sierra Leone to N. & S. Nigeria, in forests and shady ravines. (See Appendix).
11. *A. lycobasis* K. Schum. l.c. 215. *A. biauicraticum* K. Schum. l.c. 207?
- S. Nigeria: Oban! Johann Albrechtshöhe (Mar.)! Also in Angola? Exsicc.—*Talb.* 32; 33; 95. *Staudt* 680.
12. *A. sulcatum* K. Schum. l.c. 205, fig. 26A–D; Chev. Bot. 626; Stapf 655. *A. erythrostachyum* Gagnep. *A. Zimmermannii* A. Chev. Bot. 626, not of K. Schum. *Amomum sulcatum* Oliv. & Hanb.—F.T.A. 7: 304. Rhizome slender, creeping; fruiting peduncles about 1½ in. long; fruits deeply sulcate.
- French Guinea: various localities! Sierra Leone: Jigawa, 1,100 ft. (fr. Sept.)! Kamala (May)! Liberia: Cape Palmas! Exsicc.—*Pobiquin* 319; 941. *Thomas* 398; 2830. *Hoffman* 14. *Gibson*. *Smythe* 32; 33. *Canille* 14803. *Chev.* 20906, etc. (See Appendix).
13. *A. melegueta* K. Schum. l.c. 204; Chev. Bot. 625; Stapf 655. *Amomum melegueta* Rosc. Scit. t. 98; F.T.A. 7: 303; Holl. 662. *Aframomum melegueta* K. Schum. A herb 3 ft. high; inflorescences at the base of the leaf-stem, 1-flowered, very short; petaloid staminode pink or lilac.
- From French Guinea to N. and S. Nigeria, and Fernando Po. Also in St. Thomas and Angola. Exsicc.—*Dudgeon* 37. *Sc. Elliot* 4577. *Chev.* 23418, etc. *Daniell*. *Yates* 38. *Thomas* 845. *Holl.* 254. *Afzelius*. *Smeathman*. *Sagot* 568. (See Appendix).
14. *A. leptolepis* K. Schum. l.c. 216. *Amomum leptolepis* K. Schum.—F.T.A. 7: 307. Rhizome creeping; inflorescences solitary, very short, about 3-flowered; petaloid staminode pale violet, yellow towards the base, broadly obovate.
- S. Nigeria: bush-forest north of Barombi (Sept.)! Also in French Cameroons. Exsicc.—*Preuss* 555 bis.
15. *A. sceptrum* K. Schum. l.c. 214; Chev. Bot. 626. *Amomum sceptrum* Oliv. & Hanb.—Bot. Mag. t. 5761. F.T.A. 7: 306. Herb 5–6 ft. high; petaloid staminode pink or pale lilac.
- Sierra Leone: Kafoke (Sept.)! Yoniwana (Oct.)! Ivory Coast: Toura country (May)! Gold Coast: Aburi (Mar.)! Wawasi (Feb.)! Eduwasa (Feb.)! Sensam, Ashanti! Kpetsin! Adeambra (Mar.)! Extends to Gabon. Exsicc.—*Thomas* 1077; 2137. *Johnson* 189; 866. *Chipp* 103; 129. *Irvine* 526. *Chev.* 21598. *A. S. Thomas* D. 129.
16. *A. Daniellii* K. Schum. l.c. 218. *Amomum Daniellii* Hook. f. in Hook. Kew Journ. Bot. 4: 129, t. 5 (*Afzelii*); Bot. Mag. t. 4764. *A. Daniellii* var. *purpureum* Hook. f. l.c. 6: 294. *A. Clusii* Hook. Bot. Mag. t. 6250 (of Sm.?). *A. angustifolium* Baker in F.T.A. 7: 308, partly (excl. E. Afr. specimens, not of Sonnerat); Holl. 661. *Aframomum Hanburyi* K. Sch. l.c. 217, fig. 26E. Leafy stems up to 15 ft. high; labellum yellow.
- S. Nigeria: Lagos! Fernando Po: all through the forest! Also in Prince's Island, St. Thomas, Gabon and Angola. Exsicc.—*Mann* 1170. *Barter*. *Daniell*. *Millen* 109. *Exell* 855. (See Appendix).
- A specimen collected by *Linder*, No. 99, at Du River, Liberia, may also be this species.
17. *A. latifolium* K. Schum. l.c. 209; Stapf 655. *Amomum latifolium* Afz.—F.T.A. 7: 305; Holl. 662. *Aframomum Kayserianum* K. Schum. *Amomum Kayserianum* K. Schum.—F.T.A. 7: 305.
- Sierra Leone: between Kisey and Sierra Leone, grassy slopes of hills! Base of Sugar Loaf Mt.! Exsicc.—*Daniell* 2: 5. (See Appendix).
18. *A. Dalzielii* Hutch. in Kew Bull. 1936: ined.
- S. Nigeria: forest ravine above Buea, 3,500 ft. (Feb.)! Buea! Exsicc.—*Dalz.* 8235. *Deistell* 455.
19. *A. cuspidatum* K. Schum. l.c. 209. *Amomum cuspidatum* Gagnep. *Aframomum leonense* K. Schum. l.c. 214. *A. citratum* A. Chev. Bot. 625, not of K. Schum. *A. oleraceum* A. Chev. Petaloid staminode pale pink.
- French Guinea: Guerze's country (Mar.)! Sierra Leone: near Kambia (Jan.)! Ivory Coast: various locs.! Exsicc.—*Sc. Elliot* 4511. *Chev.* 19468; 19851; 20943. (See Appendix).

2. RENEALMIA Linn. f.—F.T.A. 7: 311; K. Schum. in Engl. Pflanzenr. Zingiberaceae 282.

Inflorescence borne at the top of the leafy shoot:

Leaves broadly oblanceolate, acutely acuminate, 20 cm. long, 5–5.5 cm. broad, with very numerous ascending parallel lateral nerves; sheath broadened in contact with the stem, not ligulate; flowers not seen; bracts lanceolate, 2 cm. long, ribbed, glabrous; fruits oblong, 2 cm. long 1. *Battenbergiana*

- Leaves elongate-lanceolate, acutely acuminate, about 35 cm. long and 4-5 cm. broad, with numerous very closely parallel lateral ascending nerves; sheath abruptly broadened in contact with the stem; bracts densely pubescent; fruits ellipsoid, 1-1.3 cm. long 2. *longifolia*
- Inflorescence borne directly on the rhizome and apart from the leafy shoot:
- Calyx in fruit more or less campanulate-funnel-shaped, about as broad as long:
- Leaves oblong-elliptic, caudate-acuminate, shortly cuneate at the base, about 20 cm. long and 6-7 cm. broad, with very numerous ascending parallel lateral nerves; inflorescence about 10 cm. long; bracts elliptic, about 1 cm. long; calyx 7 mm. long 3. *Mannii*
- Leaves elongate-oblancoate, very acutely caudate-acuminate, narrowed to the base from near the top, about 30 cm. long and 5-5 cm. broad, with very close ascending lateral nerves; inflorescence about 30 cm. long; bracts elliptic, about 1.5 cm. long; calyx 7 mm. long 4. *Talbotii*
- Calyx in fruit narrowly funnel-shaped, much longer than broad:
- Inflorescence nearly as long as the leaves, about 30 cm. long:
- Axis of inflorescence shortly pubescent; calyx-tube 5 mm. long; leaves elongate-oblancoate, acutely acuminate, 30 cm. long, 4-5.5 cm. broad, with numerous close ascending lateral nerves 5. *cinnammina*
- Axis of inflorescence glabrous; leaves as above but 5-6 cm. broad; branches of inflorescence arcuately spreading 6. *albo-rosea*
- Inflorescence much shorter than the leaves; leaves broader and shorter than above:
- Fruits puberulous, narrowly oblong; leaves about 20 cm. long and 10 cm. broad, obovate-elliptic; basal bracts small 7. *maculata*
- Fruits glabrous, broadly ellipsoid; leaves 20 cm. long and 5 cm. broad, broadly oblancoate; basal bracts small 8. *africana*
- Fruits minutely puberulous, broadly ellipsoid; leaves about 35-45 cm. long and 8-10 cm. broad, elongate-obovate-elliptic; basal bracts much larger than the others, ventricose 9. *macrocolea*
1. *Renealmia Battenbergiana* Cummins ex Baker F.T.A. 7: 313; K. Schum. l.c. 289. A herb about 1 ft. high, with red subturlose fruits. Ivory Coast: Attié Prov.; Alépé (Feb.-Mar.)! Malamassalo! Gold Coast: Assin Yan Kumasi! Exsicc.—Cummins 197. Chev. 17480; 17504; 17900.
 2. *R. longifolia* K. Schum. l.c. 289; Stapf 656. *R. ivoryensis* A. Chev. Like the last, but with much narrower elongated leaves and a series of hairy bracts in each partial inflorescence; berries red. Liberia: Grand Bassa! near Kakatown! Dukwai River, Monrovia (fr. Oct.-Nov.)! Ivory Coast: Grabo (July)! Exsicc.—Dinklage, 1945. Cooper 47. Whyte. Chev. 19608. Linder 1298.
 3. *R. Mannii* Hook. f.—F.T.A. 7: 312. Flowering stems several from the rhizome with rather crowded bracts. Fernando Po! Exsicc.—Mann 1172.
 4. *R. Talbotii* Hutch. in Kew Bull. 1936: ined. S. Nigeria: Oban! Exsicc.—Talbot. 1652.
 5. *R. cinnammina* Baker—F.T.A. 7: 312; K. Schum. l.c. 295. S. Nigeria: Oban! Between Victoria and Bimba! Extends to Gabon. Exsicc.—Talbot. 876. Preuss 1348.
 6. *R. albo-rosea* K. Schum. l.c. 293. S. Nigeria: near Victoria (Sept.)! Also in French Cameroons. Exsicc.—Winkler 357.
 7. *R. maculata* Stapf in Johnston Liberia 656. Leafy stems 5-6 ft. high, leaves spotted maroon; flowers white. Liberia: near Kakatown! Gbanga, in forest (Sept.)! Ivory Coast: Bingerville! Agnieby! Foot of Mt. Noubia! Exsicc.—Whyte. Chev. 15400; 15501; 17139; 21137. Linder 619.
 8. *R. africana* Benth. ex Hook. f. in Hook. l.c. Pl. t. 1430. Leafy stems up to 4 ft. high; inflorescences arising from the stock below the leaves. Cameroons Mt.: Upper slopes, forest at 5,000 ft.! Fernando Po, 1,300 ft.! Extends to Gabon. Exsicc.—Mann 323. Johnston 106.
 9. *R. macrocolea* K. Schum. l.c. 294. Togo: Misahöhe, in moist primary forest (June & Nov.)! Exsicc.—Baumann 315. Müldr. 7299.

3. *COSTUS* Linn.—F.T.A. 7: 297. (*Cadalvena* Fenzl.)

Flowering stems separate from the leafy stems, the reduced leaves without a blade:

Leaf-sheaths or petioles setose-pubescent or pilose:

Leaves broadly oblancoate, acuminate, narrowed to the base, about 20 cm. long and 6 cm. broad, shortly and thinly pubescent below; petiole about 1 cm. long; spike long-pedunculate, arising from the rhizome; bracts few on the peduncle, clustered and tubular; floral bracts few, small, puberulous; calyx about 1 cm. long, 3-toothed, closely nerved and puberulous 1. *Dinklagei*

Leaves elliptic-obovate, long-acuminate, narrowed to the base, about 25 cm. long and 8-10 cm. broad, pilose especially on and towards the midrib below; petiole densely rufous-hirsute; leaf-sheath ciliate with very long white hairs; flowering stems about 15 cm. long; bracts truncate, overlapping, about 2 cm. long, minutely pubescent; calyx 1.5 cm. long, shortly lobed, glabrous; ovary tomentose 2. *Schlechteri*

Leaf-sheaths and petioles glabrous:

Leaf-blades obovate, gradually acuminate, long-cuneate at the base and gradually narrowed into the short petiole, 15-25 cm. long, 5-7 cm. broad, glabrous except the pilose midrib below; bracts on the peduncle tubular, truncate, slightly overlapping, the middle ones about 8 cm. long; floral bracts forming a cone-like body in fruit, broadly ovate, with narrow membranous margins 3. *albus*

- Leaf-blades oblong-obovate, broadly acuminate, broadly attenuated to an almost rounded base and there long-pilose on the margin, 25–30 cm. long, 7–8 cm. broad, glabrous on both surfaces and on the midrib; bracts on the peduncle scarcely overlapping, 3–5 cm. long, oblique at the apex, glabrous; head ovoid, 6 cm. long, with broadly ovate-rounded membranous-margined bracts; floral bracts narrowly elliptic, 2 cm. long, closely nerved, glabrous; calyx 1.5 cm. long, shortly 3-lobed, glabrous; corolla about 4.5 cm. long 4. *Zechii*
- Leaves unknown; inflorescence cone-like, up to 12 cm. long and 6 cm. diam.; bracts rounded-ovate, very imbricate, about 3 cm. long, glabrous; calyx 2–2.5 cm. long; ovary thinly pubescent 5. sp. near *giganteus*
- Flowers and leaves borne on the same shoot, or if most of the leaves reduced then the upper with foliaceous blade:
- Stems well developed, sometimes very tall.
- Spikes lateral, subsessile, with few ovate bracts; leaves oblong, long-acuminate, narrowed and shortly petiolate, 12–20 cm. long, 4.5–5 cm. broad, ligule tubular and very long, reaching nearly to the next leaf; floral bracts lanceolate, pubescent; calyx 1.5 cm. long, 3-toothed, glabrous. 6. *Talbotii*
- Spikes terminal:
- Leaves at most thinly pilose or pubescent below, sometimes glabrous or nearly so; blade obovate-elliptic, gradually long-acuminate, narrowed to the rounded base,

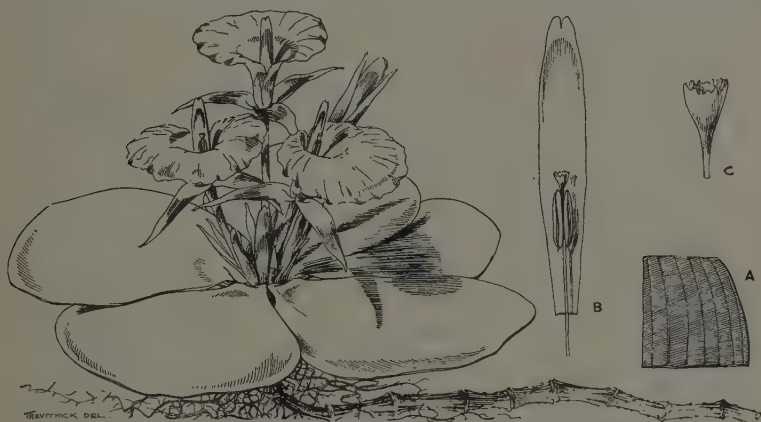


FIG. 293.—*COSTUS SPECTABILIS* K. Schum. (ZINGIBERACEAE).

Whole plant showing habit (root-stock erect in nature). A, part of leaf showing nervation. B, stamen with petaloid connective and style. C, stigma.

- 10–15 cm. long, 5–7 cm. broad, shortly petiolate at the base; ligule with or without a rim below the apex, rim glabrous or ciliate; bracts rounded 7. *afra*
- Leaves glabrous below, cuneate to an acute base, gradually and acutely acuminate, 15–20 cm. long, 5–8 cm. broad, shortly petiolate; ligule about 1 cm. long, without a rim below the apex, glabrous; flower-heads about 3 cm. diam., with rounded striate glabrous bracts 8. *Deisteli*
- Leaves densely tomentose below; leaf-sheaths with a ciliate rim below the apex and encircling the sheath; leaf-blades obovate-elliptic, long and acutely acuminate, about 20 cm. long and 6–7 cm. broad, with raised parallel nerves above; flowers in a dense terminal cluster; inner bracts hairy at the tips 9. *Lucanusianus*
- Stems very short, with 1 or more leaves in a rosette:
- Leaves several in a rosette, obovate-orbicular, rounded to a mucronate apex, broadly cuneate at the base, up to 12 cm. long and 10 cm. broad, with fairly numerous ascending nerves and fine parallel transverse nerves; calyx spathaceous; tube 4 cm. long 10. *spectabilis*
- Leaves solitary, broadly obovate-elliptic, not acuminate, shortly narrowed at the base, 8–12 cm. long, 6–8 cm. broad, glabrous, with numerous ascending nerves; flower-spike small, sessile at the apex of the stem within the leaf-sheath, 2–3-flowered 11. *Englerianus*
1. *Costus Dinklagei* K. Schum. in Engl. Pfazenr. Zingiberac. 408. Leafy stems nearly 6 ft. high, with hairy leaf-sheaths.
8. Nigeria: Oban! Also in French Cameroons. Exslcc.—*Talb.* 839.
2. C. *Schlechteri* Winkler in Engl. Bot. Jahrb. 41: 275. Leafy stems 6 ft. high.

- Ivory Coast: Upper Sassandra, Dyolas country (Aug.)! S. Nigeria: Victoria, in forest behind the church house (May)! Exsicc.—Winkler 25a. Chev. 21517.
3. *C. albus* A. Chev. Bot. 627.
Ivory Coast: Bettlé, Lower Comoé (Mar.)! Dabou! S. Nigeria: Olokimeji, edge of forest! Exsicc.—Chev. 15217; 17579.—Flowered at Kew in Aug. 1911.
4. *C. Zeebii* K. Schum. l.c. 409.
Togo: near Kete Kratschi! Exsicc.—Zeeb. 273c.
5. *C. sp.* near *giganteus* Welw. ex Ridl.—F.T.A. 7: 302; K. Schum. l.c. 407. Inflorescence large and almost like a Cycad cone.
Gold Coast: Ashanti; Ejura! Exsicc.—Lowe & Waldron (Herb. Mus. Brit.).
6. *C. Talbotii* Ridl. in Cat. Talb. Nig. Pl. 111. Remarkable for the very long ligule produced from one leaf right to the base of the next, and in having axillary inflorescences.
S. Nigeria: Oban! (The Cameroons' plant, *Zenker* 3823, cited by Ridley, l.c., is not the same species.) Exsicc.—Talb. 1521.
7. *C. afer* Key in Bot. Reg. t. 683; Bot. Mag. t. 4979; F.T.A. 7: 299; K. Schum. l.c. 392; Stapf 656; Holl. 4: 657; Chev. Bot. 627. *C. bingervilleensis* A. Chev. *C. insularis* A. Chev. *C. lucanusianus* A. Chev. Bot. 627, not of Braun & K. Schum. *C. luteus* A. Chev. *C. littoralis* K. Schum.; Stapf 656. *C. dubius* K. Schum. *C. obliterans* K. Schum. *C. anomocalyx* K. Schum.
A common plant in moist shady places throughout the area and as far as Gabon; also in East Africa south to Nyasaland; leaves very variable as to indumentum. (See Appendix).
8. *C. Deistlii* K. Schum. in Engl. Pflanzenz. Zingiberac. 393. *C. pulcherrimus* A. Chev. Bot. 628. A herb about 3 ft. high; stems leafy in the upper part, with a head of yellow flowers.
Ivory Coast: Cavally Basin; several localities! Togo: Akposos (May)! Cameroons Mt.: Buea, in mountain forest (Feb.). Exsicc.—Chev. 19568; 19717; 19732. Doering 278.
9. *C. Lucanusianus* J. Braun & K. Schum.—F.T.A. 7: 299; Holl. 4: 657; K. Schum. l.c. 392; Schlechter Kautschuk-Exped. 64, with fig. Herbaceous, 8–10 ft. high; calyx green; inner perianth white and red.
Ivory Coast: Upper Sassandra; Dyolo Country (May)! S. Nigeria: Abo! Benin! Ugunzu! Oban! Fernando Po! Extends to Gabon. Exsicc.—Vogel 1. Chev. 21516. Dennet 17. Talb. 840. Kusun. Mann 439. (See Appendix).
10. *C. spectabilis* K. Schum. in Engl. Bot. Jahrb. 18: 422. *Cadalena spectabilis* Fenzl—F.T.A. 7: 297; Bot. Mag. t. 7992; Chev. Bot. 624. *C. Dalzielii* C. H. Wright—Hook. l.c. Pl. t. 3013. Herb with rosette of suborbicular leaves spread flat on the ground; flower bright orange or yellow.
French Guinea: Bolota, near Kankan, 1,500 ft. (July)! Sierra Leone: Kafuru! Ivory Coast: Upper Sassandra! N. Nigeria: Kilba country, Yola Prov. (July)! Very abundant from south of Sokoto Prov. and throughout Kontagora Prov. (June)! North of Keana! Liruwen-Kano Hills! Bauchi Plateau, Vom! Top of Zaranda Mt., 5,800 ft. (May)! Throughout the African plateaux to Rhodesia and Nyasaland, and in the island of St. Thomas. Exsicc.—Chev. 21659. Collenette 80. Glanville 376. Dalz. 229; 560. Dauce 498. Hepburn 48. Carpenter. Dent-Young 239. Lely 198; P. 304. (See Appendix).
11. *C. Englerianus* K. Schum. in Engl. Bot. Jahrb. 15: 419, t. 13.—F.T.A. 7: 300; K. Schum. in Engl. Pflanzenz.-Zingiberac. 424. A unifoliate fleshy herb with white perianth and deep violet throat.
Sierra Leone: Ivory Coast: Alépé (Feb.—Mar.)! Gold Coast: Tarquah, in dense shade of forest, very moist ground (Sept.—Dec.)! Begoro-Akim (Apr.)! S. Nigeria: Baromli. Also in French Cameroons. Exsicc.—Irvine 1357. Miles 8. Hort. Sander. Chev. 17407. Carpenter 330.

4. **KAEMPFERIA** Linn.—F.T.A. 7: 294; K. Schum. in Engl. Pflanzenz. Zingiberaceae 64.

Tubers oblong-fusiform, about 5 cm. long; leafy stems arising separately from the rhizome; basal leaves reduced to sheaths; upper leaves oblanceolate, very acute, the largest about 25 cm. long and 4 cm. broad, attenuated to the base, with numerous ascending parallel nerves; ligule conspicuous up to about 1.5 cm. long, striately nervose; flowers in a separate cluster from the rhizome; calyx tubular, 3–4 cm. long, shortly 3-lobed, lobes rounded; petals lanceolate, 4 cm. long, united into a slender tube; petaloid staminodes about 10 cm. long, limb nearly as wide, the lip broad and emarginate 1. *aethiopica*

Tubers small, about 3 cm. long; leafy stems as above, basal leaves reduced to sheaths; upper leaves elliptic or obovate-elliptic, narrowed to the base, abruptly acute at the apex, the largest about 25 cm. long and 8 cm. broad, with numerous ascending parallel nerves; leaf-sheath without a ligule; flowers in a separate cluster from the rhizome; calyx about 1.5 cm. long; petals and staminodes as above. 2. *nigerica*

1. *Kaempferia aethiopica* Benth.—F.T.A. 7: 294; K. Schum. l.c. 66, fig. 10, A–C; Chev. Bot. 624; Holl. 4: 657. A perennial herb up to 1 ft. with tuberous roots, the flowers often appearing before the leaves and often mistaken for a ground orchid; the apparent corolla is the united petaloid purple or blue staminodes.
French Sudan: Gourma (July)! Senegal! Gambia: common in woodlands! Sierra Leone: Kasikeri (May)! Ivory Coast: Mankono (June)! Gold Coast: Salaga (Apr.)! Dahomey: Djonjou 1,400 ft. (June)! N. Nigeria: Musgu, S. Bornu (May)! Bauchi Plateau (Apr.)! Keana (Mar.)! Abinsi (May)! Zaria (June)! Liruwen-Kano Hills! Bichikiki, 2,200 ft. (May)! Lokoja (Apr.)! S. Nigeria: common in grassy plains from Oyo to Ilorin! Also in the Cameroons, Nile Districts, East and South Tropical Africa. Exsicc.—Heudelot 876. Brooks 62. Thomas 174. Krause. Vogel 99. Lely 176; P. 218. Dalz. 829. Lamb 60. Barter 3427. Chev. 21845; 23902; 24531. (See Appendix).

2. *K. nigerica* Hutch. in Kew Bull. 1936: ined. Like the above but leaves broader, without a distinct ligule at the top of the leaf-sheath, and shorter calyx; flowers paler!
N. Nigeria: Zunguru (Apr.—May)! Lokoja; slope of Mt. Pati (Mar.)! Abinsi; in ravines in Munchi country (June)! S. Nigeria: Lagos Colony (Feb.)! Exsicc.—Dalz. 276; 830. Elliott 42. Conservator of Forests, Lagos, 449. (See Appendix).

5. **CURCUMA** Linn.—K. Schum. in Engl. Pflanzenz. Zingiberaceae 99.

Leaves long-petiolate, petiole sheathing about 6 cm. from the apex; blade elliptic, acute at the apex, cuneate and unequal-sided at the base, up to about 35 cm. long and 11 cm. broad, very thin, with numerous spaced lateral ascending nerves and a prominent midrib; inflorescence from the base of the stem, shortly pedunculate; bracts broadly overlapping, about 5-seriate, ovate-orbicular, thinly puberulous outside, membranous; calyx 8 mm. long; corolla shorter than the bracts *longa*

- C. longa* Linn.—K. Schum. l.c. 108; Holl. 4: 659.
Introduced; native probably of East Indies. (See Appendix).

162. CANNACEAE

Tall leafy perennial rhizomatous herbs. Leaves large, broad, pinnately nerved, with a distinct midrib. Flowers racemose or paniculate, bracteate, zygomorphic, brightly coloured. Perianth double, the outer calyx-like, the inner corolla-like. Sepals 3, imbricate, free, herbaceous. Petals 3, connate at the base and adnate to the staminal column. Stamens petaloid, 3 outer sterile, imbricate, 2 inner more or less connate, 1 free; anther solitary, 1-celled, cell adnate to the side of the petaloid portion. Ovary inferior, 3-celled; ovules numerous, axile. Fruit a capsule, pericarp often warted. Seeds many, rounded, with very hard endosperm.

Mainly in tropical and subtropical America.

CANNA Linn.—F.T.A. 7 : 327.—Characters of the family.

Stems glabrous, erect; leaves ovate-elliptic, broadly acuminate, abruptly cuneate at the base, up to 40 cm. long and 25 cm. broad, glabrous, with numerous fine close parallel nerves diverging from the midrib at an angle of 45°; racemes terminal, few-flowered; pedicels very short; bracts ovate, about 1.3 cm. long; sepals lanceolate, 1.3 cm. long; petals linear-lanceolate, acute, about 4 cm. long; staminodes 3, one of them bidentate at the apex, spatulate-oblancheolate, about 4 cm. long; style as long as the staminodes, flattened; fruit closely muricate .. *bidentata*

Canna bidentata Bertoloni in Mém. Acad. Sc. Bologna 10 : 33, t. 5 (1859); Kränzlin in Engl. Pflanzenr. Cannaceae 46. *C. indica* subsp. *orientalis* Baker—F.T.A. 7 : 328. Flowers orange-red.

Common in and near towns and villages throughout the area, and in other parts of tropical Africa and as far south as Natal; also in Mascarene Islands. (See Appendix).

163. MARANTACEAE

Perennial herbs. Leaves in two rows, differentiated into an open sheath, stalk and blade, the stalk often winged, but terete and pulviniform towards the apex, the blade sometimes with one straight and one curved side, with closely parallel numerous nerves diverging obliquely from the midrib. Flowers hermaphrodite, asymmetric, in a terminal bracteate spike or panicle, or the inflorescence arising from the rhizome. Perianth mostly differentiated into calyx and corolla; outer segments free, inner more or less tubular, divided into 3 mostly unequal parts. Fertile stamen 1; anther 1-celled; staminodes variously petaloid. Ovary inferior, 3-1-celled; style stout, often dilated at the apex. Ovule solitary, erect. Fruit fleshy or a capsule. Seeds with abundant endosperm, and incurved or folded embryo, and often with an aril.

Tropics and subtropics, mostly in moist or swampy primary forest.

Ovary 3-celled:

Leaves more or less equal-sided (sides equally rounded):

Pairs of flowers furnished with small thickened glandular bracteoles:

Ovary and fruit smooth:

Inflorescence borne on the stem, branched; fruit not winged 1. *Sarcophrynium*

Inflorescence arising from the creeping rhizome, spicate; fruit 3-winged

2. *Thaumatococcus*

Ovary and fruit muricate:

Fruit dehiscent; seeds with a multilamellate basal aril ..

3. *Hybophrynium*

Fruit not dehiscent; seeds not arillate

4. *Trachyprynium*

Pairs of flowers without bracteoles:

Flower-pairs solitary; sepals very unequal

5. *Halopegia*

Flower-pairs 2 or more together; sepals equal

6. *Phrynium*

Leaves with one nearly straight side and one rounded side ..

7. *Marantochloa*

Ovary 1-celled with 1 erect ovule; leaves equal-sided; flowers laxly paniculate; fruit

1-seeded, the seed filling the cavity

8. *Thalia*

1. **SARCOPHRYNIUM** K. Schum. in Engl. Pflanzenr. Marantac. 35 (1902).

Bracts persistent:

Inflorescence sessile, branched from the base, up to 7 cm. long; bracts overlapping, boat-shaped, 1.5–2 cm. long; leaves ovate-elliptic, rounded at the base, 20–30 cm. long, 10–15 cm. broad, with very numerous closely parallel lateral nerves; terete

portion of petiole 4-6 cm. long; fruits subglobose, scarcely bilobed, shining and wrinkled when dry, about 1.5 cm. diam. 1. *brachystachyum*
 Inflorescence pedunculate, paniculate; bracts very lax, containing 2 to several flowers, 4 cm. long; peduncle thinly villous; leaves elliptic, acuminate, rounded at the base, about 32 cm. long and 12-16 cm. broad; terete portion of petiole 5-9 cm. long 2. *prionogonium*

Bracts deciduous:

Inflorescence branched:

Axis of the inflorescence distinctly pubescent; bracts 1.5 cm. long; leaves ovate-elliptic, rounded at the base, shortly acuminate, 30-35 cm. long, 20-22 cm. broad, with very numerous parallel lateral nerves; sepals ovate-lanceolate, broad at the base; fruit depressed-triangular, about 2 cm. diam. 3. *macrophyllum*
 Axis of inflorescence glabrous or minutely puberulous; bracts 2 cm. long; leaves as in preceding species; sepals oblanceolate, narrowed to the base; fruit depressed, 2.5 cm. diam. 4. *macrostachyum*
 Inflorescence simply spicate, 4.5 cm. long; peduncle 2.5 cm. long, glabrous; bracts oblong, acute; leaves elliptic, rounded at the base, shortly acuminate; sepals oblong 5. *spicatum*

1. *Sarcophrynium brachystachyum* K. Schum. in Engl. Pflanzen. Marantac. 36; Chev. Bot. 631; Stapf 657. *Phrynium brachystachyum* Koernicke—F.T.A. 7: 322; Chev. Bot. 630. *Phrynium molle* A. Chev. Bot. 631. A herb 6-8 ft. high, with reddish fruits, growing in forest; calyx green; corolla white or yellow.
 French Guinea: Kourila! Sierra Leone: various localities! Liberia: Cape Palmas! Grand Bassa! Ivory Coast: various localities! Gold Coast: Kibbi (Dec.)! Maso (fr. June)! Assin-yan-Coomassie! N. Nigeria: Lapa! (Mar-Apr.)! Lokoja (Mar.)! S. Nigeria: Onitsha! Banks of the Nun River (Sept.)! Also in Cameroons and Gabon. Exsicc.—Sc. Elliot 4473a; 4943. Thomas 8670. Vogel 29; 77. Johnston 245. Cummins 187. Barter 1545. Mann 517. Talb. 883. Afzelius. Smeathmann. Irvine 321. Caille in Herb. Chev. 14822. Chev. 15212, 15396, etc. (See Appendix).
2. *S. prionogonium* K. Schum. l.c. 39. *Phrynium prionogonium* Baker—F.T.A. 7: 325. *P. cerasiferum* A. Chev. Bot. 630. Leaf-sheaths villous; panicle very lax; fruit red.
 Ivory Coast: various localities! S. Nigeria: Oban! Barombi, in forest! Also in French Cameroons and Uganda. Exsicc.—Talb. 877. Preuss 458. Chev. 16746, etc. Carpenter 289; 404.
3. *S. macrophyllum* Hutch. in Kew Bull. 1936: ined. *Phrynium macrophyllum* Baker—F.T.A. 7: 323. *S. macrostachyum* K. Schum. l.c. 37, partly, as to syn. Leaf single on a stem about 4 ft. high; flowers yellow with a red spot; fruits orange.
 Gold Coast: Assin-yan-Coomassie! Asamankese (Dec.)! Togo: banks of the Ahã River (Apr.)! Exsicc.—Cummins 206. Plumpton 48. Baumann 174. (See Appendix).
4. *S. macrostachyum* K. Schum. l.c. 37, partly, excl. part of syn. *S. adenocarpum* K. Schum. *S. ozyacarpum* K. Schum. *Phrynium adenocarpum* Baker—F.T.A. 7: 324. *P. ozyacarpum* Baker l.c. *P. Benthamsii* Baker l.c. 323; Holl. 667. Up to 15 ft. high; fruits bright red; seeds black.
 S. Nigeria: Lagos! Oban! Amonsim! Ambas Bay! near Barombi, in forest! Also in French Cameroons. Exsicc.—Millen 19. Dawodu 120. Talb. 880. Mann 1335. Preuss 343; 381. Kitson. (See Appendix).
5. *S. spicatum* K. Schum. in Engl. Pflanzen. Marant. 40; Stapf 657.
 Liberia: Grand Bassa, near the coast in primary forest on the R. Cestos (May). Exsicc.—Dinklage 1946.

2. THAUMATOCOCCUS Benth.—F.T.A. 7: 320.

Leaves ovate-elliptic, rounded-truncate at the base, shortly acuminate, up to 35 cm. long and 24 cm. broad, papery, with very numerous parallel nerves diverging from the midrib at an angle of about 45°; petiole subterete; spikes simple or forked about 10 cm. long; bracts imbricate, 4 cm. long; flowers as long as the bracts; sepals broadly linear, 1 cm. long; corolla-tube very short, lobes oblong, 2.5 cm. long; ovary silky; fruit 3-winged, hard, 3 cm. diam. *Daniellii*

- T. *Daniellii* Benth.—F.T.A. 7: 321; K. Schum. in Engl. Pflanzen. Marantac. 40, fig. 8; Chev. Bot. 630; Holl. 666. A herb up to 10 ft. high; rhizome slender, creeping; spikes arising from the base, rough with the scars of the fallen flowers, the latter pale purple; fruit crimson, out of the ground; seeds black, hard, shining.
 Sierra Leone! Ivory Coast: various localities! Gold Coast: Assin-yan-Coomassie! Liberia: Gbanga! S. Nigeria: Onitsha! Ambas Bay (Dec.)! Also in French Cameroons, St. Thomas and Princes Islands and Uganda. Exsicc.—Daniell. Johnston. Cummins 185. Barter 1546; 1990. Mann 2145. Chev. 16940; 19152; 21135. Linder 668. (See Appendix).

3. HYBOPHRYNIUM K. Schum. in Engl. Bot. Jahrb. 15: 428, with fig. (1892); and in Engl. Pflanzen. Marantac. 41.

Leaves oblong-elliptic, rounded or truncate at the base, acuminate, 7-14 cm. long, 3.5-6.5 cm. broad, glabrous, with numerous closely parallel lateral nerves diverging from the midrib at an angle of 45°; petiolar sheath encircling the shoot; apical terete portion 1-1.5 cm. long; inflorescence terminal, simple or slightly branched, shorter than the leaves; axis pubescent to glabrous; bracts caducous, 2.5 cm. long; capsule deeply 3-lobed, densely muricate; seeds ellipsoid, with a large lamellate basal aril *Braunianum*

- H. *Braunianum* K. Schum. l.c. 429, fig. A-F. *Trachypphrynium Braunianum* Baker—F.T.A. 7: 319; Chev. Bot. 629.
 French Guinea to Eastern Sudan and Uganda and through the Belgian Congo to Angola. Exsicc.—Sc. Elliot 4457a; 4464; 4508; 4622; 4854. Thomas 8776; 8062. Johnston 99. Lane-Poole 158. Vogel 13. Barter 1784. Dalz. 832; 1281; 8291. Preuss 407. Mann 1175; 2140. Chev. 12783, etc. Linder 347; 629. (See Appendix).

4. **TRACHYPHYNIUM** Benth.—F.T.A. 7: 318; K. Schum. in Engl. Pflanzenr. Marantac. 42.

Branches armed with numerous small prickles; leaves oblong-elliptic or ovate-elliptic, rounded at the base, acutely acuminate, 8–20 cm. long, 4–11 cm. broad, with numerous closely parallel lateral nerves; petiole sheathing around the stem; upper terete portion 1–1.5 cm. long; spikes pendulous, up to 8 cm. long; basal bracts sterile, lanceolate, 4 cm. long; fertile bracts persistent, 2 cm. long, broad and folded

1. *Danckelmannianum*

Branches smooth:

Spikes simple or 2-forked from the base, glabrous; bracts caducous, narrowly lanceolate, 2.5 cm. long; leaves oblong-elliptic, rounded-truncate at the base, abruptly acuminate, 9–15 cm. long, 5–6 cm. broad, with numerous closely parallel lateral nerves; petiole sheathing in the lower half, the upper half articulated in the middle

2. *violaceum*

Spikes with several lateral branches; bracts persistent, closely overlapping, acutely acuminate, about 3 cm. long; leaves elliptic, rounded at the base, gradually acuminate, 12–14 cm. long, about 6 cm. broad, with numerous closely parallel lateral nerves; petiole as above, the terete portion about 2 cm. long

3. *Zenkerianum*

1. *T. Danckelmannianum* J. Braun & K. Schum.—F.T.A. 7: 319; K. Schum. l.c. 42, fig. 9, L-M. Bamboo-like shrub with wiry prickly stems.

S. Nigeria: Barombi. Extends to Gabon. Exsicc.—Preuss 255.

2. *T. violaceum* Ridl.—F.T.A. 7: 320; Stapf 657. *T. Preussianum* K. Schum.—F.T.A. 7: 320. Stems slender and bamboo-like; fruits trilobed or 3-horned, densely muricate.

French Guinea: Guéré country! Liberia: Begual (Oct.)! Ivory Coast: various localities! S. Nigeria: Barombi! Extends to Angola. Exsicc.—Preuss 144; 321. *Bunting* 106. *Talb.* 883a.

3. *T. Zenkerianum* K. Schum. l.c. 45. Bamboo-like undershrub.

S. Nigeria: Barombi. Buea. Also in French Cameroons. Exsicc.—Preuss 873. *Deistel* 206; 504; 519. *Dusen* 415.

5. **HALOPEGIA** K. Schum. in Engl. Pflanzenr. Marantac. 49 (1902).

Leaves elongate-oblong, very broadly and shortly cuneate at the base, abruptly caudate-acuminate, 20–35 cm. long, 6–9 cm. broad, very thin, with very numerous parallel nerves, a few slightly more prominent than the others; petiole very long, sheathing in the lower half, quite terete towards the apex; inflorescence branched; bracts persistent, imbricate, narrowly lanceolate, about 5 cm. long; corolla mottled; ovary silky

H. azurea K. Schum. l.c. 50. *Donax azurea* K. Schum.—F.T.A. 7: 316. *Calathea vaginata* A. Chev. Bot. 631. Stems several from a rhizome; perianth blue, yellow at the base; fruit cylindric, $\frac{1}{2}$ in. long.

Ivory Coast: several localities! Gold Coast: Akwapim (Dec.)! S. Nigeria: Oban! Also in Cameroons and Gabon and in N.E. Congo. Exsicc.—Chev. 18520, etc. *T. W. Brown* 788. *Talb.* 57. (See Appendix).

6. **PHYNIUM** Willd.—K. Schum. in Engl. Pflanzenr. Marantac. 52 (1902).

Leaves oblong-elliptic, rounded to a very slightly cuneate base, abruptly acuminate (the acumen scarcely in line with the midrib), 16–25 cm. long, 8–12 cm. broad, thinly papery, with numerous closely parallel nerves spreading from the midrib at an angle of 45°; petiole up to 20 cm. long, sheathing, the terete upper portion 1.5–2 cm. long and shortly pubescent on the upper side; spikes solitary, terminal, sessile, erect, with about 8 folded bracts, 5–6 cm. long; bracts lanceolate, boat-shaped, 4 cm. long, thinly pubescent; flowers several to each bract

1. *Mannii*

Leaves broadly oblong-elliptic, rounded to the base, otherwise as above, but petiole sheathing only in the lower part; spikes shorter than above and deflexed, with broadly obovate glabrous bracts

2. *confertum*

1. *P. Mannii* K. Schum. l.c. 56. *Calathea Mannii* Benth.—F.T.A. 7: 327. Herb 2–3 ft. high, with small sessile spikes of flowers in the middle of a terminal cluster of leaves; leaf-sheaths open to the base.

Fernando Po! Also in Cameroons. Exsicc.—Mann 1178.

2. *P. confertum* K. Schum. l.c. *P. crista-galli* A. Chev. Bot. 631. *Calathea conferta* Benth.—F.T.A. 7: 327; Boll. 669. Herb 4–5 ft. high; bracts dull red; flowers pink.

Ivory Coast: Malinalasso (Mar.)! Gold Coast: Kibbi-Akim, in swamps (Dec.)! Assin-yan-Coomassie! S. Nigeria: Oban! Cameroons Mt., 3,000 ft. (Dec.)! Extends to Angola. Exsicc.—Chev. 17499. *Johnston* 246. *Cummins* 64. *Mann* 2144. *Talb.* 884. (See Appendix).

7. **MARANTOCHLOA** Brongn. ex Gris in Bull. Soc. Bot. Fr. 7: 321 (1860). *Clinogyne* Benth. in small part, not of Salisb. *Donax* K. Schum. in Engl. Bot. Jahrb. 15: 434, and Baker in F.T.A. 7: 315, not of Lour.

Leaves broadly and obliquely pointed but hardly acuminate, 9–15 cm. long, 4–6 cm. broad, the blade nearly sessile on the petiolar sheath; terete portion of petiole very short, pubescent; bracts linear, 2 cm. long; lower bracts with about 4 pairs of flowers, the latter not seen

1. *inaequilatera*

Leaves more or less caudate-acuminate:

Stems bearing more than one leaf:
Bracts 1.5–2 cm. long, very few and laxly arranged on a slender inflorescence;

leaves rather small, ovate-elliptic, acutely acuminate, rounded or slightly cuneate at the base, about 12 cm. long and 6 cm. broad, the blade nearly sessile on the sheathing petiole; sepals lanceolate, striate; ovary pubescent; fruit depressed, slightly 3-lobed, wrinkled when dry, 1 cm. diam. 2. *filipes*
Bracts about 3 cm. long or more, usually closely arranged on a rather stiff inflorescence. Inflorescence branched, lax, the bracts falling off in fruit, the latter depressed-globose, 1.2 cm. diam.; ovary villous; sepals broadly lanceolate, closely striate

3. *flexuosa*
Inflorescence spiciform unbranched, the bracts persistent and enclosing the longitudinally ellipsoid fruit 4. *ramosissima*
Stems bearing only one leaf; leaves oblong-elliptic, broadly and very shortly cuneate at the base, about 30 cm. long and 12 cm. broad, with distinct transverse nerves between the numerous lateral nerves; petiole about 15 cm. long, the terete upper part about 1 cm. long; bracts about 1.5 cm. long, shortly pubescent; ovary pubescent; sepals broadly lanceolate, 3 mm. long; fruit thinly pubescent

5. *holostachya*

1. *Marantochloa inaequilatera* Hutch. in Kew Bull. 1936: ined. *Clinogyne inaequilatera* K. Schum. in Engl. Pflanzenr. Marantac. 65. *Phrynium inaequilaterum* Baker—F.T.A. 7: 325. Herb 2 ft. high, with remarkably unequal-sided leaves.

S. Nigeria: Cameroons R. (Jan.)! Exsicc.—Mann 2142.

2. *M. filipes* Hutch. in Kew Bull. 1936: ined. *Clinogyne filipes* Benth.—K. Schum. l.c. 67. *Donax filipes* K. Schum.—F.T.A. 7: 316, partly. *C. eburnea* A. Chev. Bot. 629. Herb about 5-8 ft. high; flowers greenish white; fruits red.

Sierra Leone: Rowala (July)! Benikoro (fr. Oct.)! Ivory Coast: various localities! Gold Coast: Wankye, Birrim Distr. (fr. Aug.)! Juaso, Ashanti (June)! S. Nigeria: Oban! Fernando Po! Also in French Cameroons. Exsicc.—Thomas 1181; 2912. Chev. 15397, etc. Chipp 565. Irvine 320. Talb. 881.

Mann 163. (See Appendix.)

3. *M. flexuosa* Hutch. in Kew Bull. 1936: ined. *Clinogyne flexuosa* K. Schum. l.c. 63. *Phrynium flexuosum* Benth. *P. ramosissimum* A. Chev. Bot. 631, not of Benth. *Donax Schweinfurthiana* K. Schum. *D. leucantha* K. Schum.—F.T.A. 7: 317; *D. cuspidata* Baker—F.T.A. 7: 315; Chev. Bot. 628; Holl. 664; not of K. Schum. *Clinogyne arda* Stapf 657. *C. Baumannii* K. Schum. *C. filipes* Baker—F.T.A. 7: 316, and K. Schum. l.c. 67, partly, not of Benth. *C. purpurea* Ridl. *C. Schweinfurthiana* K. Schum. *C. ramosissima* A. Chev. Bot. 629, not of K. Schum. A tall bamboo-like plant; flowers yellow or purple.

Common in undergrowth of forest from Senegambia to Nigeria and Fernando Po, extending to S.E. Sudan and Angola. Exsicc.—Don. Heudelot 729. Sc. Elliot 3900; 4196; 4473b; 4820; 4902; 5877. Thomas 2304. Deighton 1053. Mann 901. Chipp 439. Warnecke 453. Johnston 757. Dalz. 8290. Barter 97; 1542; 3372. Millen 141. Holland 37. Foster 314. Preuss 354; 386; 495. Staudt 485. Talb. 882. Chev. 12444; 12819; 13233; 17453; 20914; 21012. (See Appendix.)

There appear to be two forms, or perhaps even species, represented here. Mr. Deighton has sent them under his No. 2933, in fruit, from Talama, Sierra Leone, a tall plant 9 ft. high, straggling over bush in dense shade and with loosely branched inflorescence, and No. 2934, from Njala, erect and 3-4 ft. high in undergrowth in fringing forest, with stiffer less-branched inflorescence. Amongst the specimens quoted, however, I find several intermediates, both as to stature, branching of inflorescence, and degree of indumentum on the fruits, and it seems necessary that further field work should be carried out before the question as to specific status can be settled.

4. *M. ramosissima* Hutch. in Kew Bull. 1936: ined. *Clinogyne ramosissima* K. Schum. l.c. 64; Chev. Bot. 629. *C. arillata* K. Schum. l.c. 62. *Phrynium ramosissimum* Benth.—F.T.A. 7: 326; Holl. 667. *Donax arillata* K. Schum. Stems much branched, 4-6 ft. high; calyx rosy white; petals yellowish or white.

S. Nigeria: Oban! Cameroons R. (Jan.)! Barombi! Fernando Po (Nov.-Dec.)! Also in French Cameroons. Exsicc.—Mann. 100; 1174; 2141. Vogel 165; 178. Barter 1544. Talb. 93. Preuss 379. (See Appendix.)

5. *M. holostachya* Hutch. in Kew Bull. 1936: ined. *Clinogyne holostachya* K. Schum. l.c. 65. *Phrynium holostachyum* Baker—F.T.A. 7: 322.

S. Nigeria: Oban! Also in Gabon. Exsicc.—Talb. 875.

8. *Thalia* Linn.—F.T.A. 7: 313.

A straggling herb; leaves ovate-lanceolate, rounded or subcordate at the base, gradually and shortly acuminate, 15-40 cm. long, 8-20 cm. broad, with numerous closely parallel lateral nerves forming a cartilaginous margin; petiole sheathing in the lower part or nearly up to the terete portion; flowers in a lax panicle with slender branches; bracts 2-flowered, deciduous, lanceolate, 1.5-2 cm. long, boat-shaped; capsule 1 cm. long; seed filling the capsule, broadly oblong, with a basal aril

geniculata

T. geniculata Linn.—F.T.A. 7: 314. *T. caerulea* Ridl. *T. Welwitschii* Ridl. A straggling herb 6-8 ft. high, in swampy places; flowers open in the early morning only, purple.

Senegambia to Nigeria, extending to the Eastern Sudan, the Congo and Angola; also in America from Florida to Brazil. (See Appendix.)

164. LILIACEAE

Herbs, mostly perennial, or rarely soft-wooded shrubs; roots from a rhizome, corm or bulb, or tuberous; stem erect or climbing. Flowers hermaphrodite or rarely unisexual, sometimes large and showy, never in umbels. Perianth mostly corolla-like, with or without a tube; segments usually 6, in 2 similar series. Stamens usually 6, hypogynous; filaments usually free; anthers 2-celled, usually opening by a slit lengthwise. Ovary superior, mostly 3-celled with axile placentas, or rarely 1-celled with parietal placentas; style entire or



FIG. 294.—*Thalia geniculata* Linn. (MARANTACEAE).

A, flower. B, androecium. C, style. D, fruit with part of pericarp removed. E, seed. F, cross-section of seed.

divided, rarely styles free. Ovules usually numerous. Fruit a capsule or berry. Seeds with copious endosperm.

World-wide distribution, more abundant in temperate and subtropical regions.

In this flora there are no indigenous representatives of tribes *Agapantheae*, *Allieae*, and *Gilliesieae*, which I have transferred from the *Liliaceae* to the *Amarylhidaceae*, apart from the cultivated onions, *Allium Cepa* Linn., etc.

Leaves not reduced to scales; branches not modified into cladodes:

Stems erect; leaves not tendriform at the apex:

Rootstock a rhizome or tuber (neither a bulb nor a corm); roots fibrous or sometimes thick and tuberous:

Leaves not fleshy, or if so then not prickly on the margin:

Rootstock not thick and bulb-like, but sometimes the roots ending in tubers; seeds glabrous; pedicels not elongated:

Fruits globose or shallowly lobed; seeds not flat:

Filaments flattened and expanded at the base and encircling the ovary; perianth articulated at the base and leaving a small membranous cup 1. *Asphodelus*

Filaments not flattened at the base:

Perianth-segments free at the base 2. *Anthericum*

Perianth-segments united into a tube 3. *Notosceptrum*

Fruits deeply lobed; seeds compressed:

Racemes not closely subspicate 4. *Chlorophytum*

Racemes closely subspicate 5. *Dasystachys*

Rootstock a bulb-like tuber; seeds villous; flowers on long pedicels

6. *Eriosperrum*

Leaves fleshy, sharply toothed on the margins 7. *Aloe*

Rootstock a bulb or corm:

Perianth-segments free to the base:

Capsule more or less deeply lobed; seeds compressed 8. *Urginea*

Capsule shallowly lobed; seeds not compressed:

Stamens hypogynous:

Capsule loculicidally dehiscent:

Raceme spike-like, upper flowers not fertile 9. *Drimiopsis*

Raceme not spike-like, upper flowers fertile:

Leaves basal 10. *Albuca*

Leaves cauline 11. *Iphigenia*

Capsule septicidally dehiscent 12. *Androcymbium*

Stamens perigynous; flowers blue or mauve 13. *Scilla*

Perianth-segments united at the base:

Outer perianth-segments markedly caudate-acuminate 14. *Dipcadi*

Outer perianth-segments not caudate-acuminate:

Seeds subglobose 15. *Wurmbea*

Seeds flattened 16. *Drimia*

Stems more or less climbing or sarmentose; leaves often tendriform at the apex; flowers hermaphrodite; style spreading at a right angle from the top of the ovary

17. *Gloriosa*

Leaves much reduced and scale-like, their function fulfilled by linear or acicular cladodes; fruit a berry; flowers very small; rootstock a rhizome 18. *Asparagus*

1. ASPHODELUS Linn.—F.T.A. 7: 476.

Rootstock tuberous, erect; leaves all radical, linear, with a subulate point, up to 15 cm. long, finely scabrid, expanded and membranous at the base; racemes branched, stout, lax-flowered; bracts ovate-lanceolate, membranous, half as long as the pedicel; pedicels stout, jointed about the middle; perianth about 7 mm. long, articulating near the base and leaving a small membranous cup; fruit globose .. *fistulosus*

A. fistulosus Linn.—F.T.A. 7: 476, incl. var. *tenuifolius* Baker *A. tenuifolius* Cav.—Chev. Bot. 648; Maire in Mém. Soc. Hist. Nat. Air. Nord. 8: 74 (1933).

Mauritania: various locs. Central Sahara: Tamanrasset, 5,000 ft. (Feb.)! Widely spread from the Canaries, the Mediterranean, Eastern Sudan to India and in Mauritius. Exsicc.—Meinertzhagen 112. *Schmitt in Herb. Chev.* 28555; 28840. (See Appendix).

2. ANTHERICUM Linn.—F.T.A. 7: 477.

Rhachis of the inflorescence pubescent or puberulous; bracts lanceolate long-acuminate, the lowest about 1 cm. long:

Pedicels 5 mm. long, jointed a little below the middle; perianth 1 cm. long; leaves linear, with broad bases, minutely serrulate-scabrid on the margins, up to 25 cm. long and 1 cm. broad; capsule about 5 mm. broad 1. *pubirachis*

Pedicels very short; leaves oblanceolate to lanceolate, long-narrowed to the base,

- up to 30 cm. long and 2.5 cm. broad, very acute, thin; lower bracts about 2 cm. long 2. *limbamenense*
- Rhachis of the inflorescence glabrous:
- Peduncle winged; pedicel jointed near the base or flowers sessile:
- Flowers sessile, clustered in the panicle; leaves linear, acute, with close nerves and thin glabrous margins; primary bracts lanceolate; fruits oblong-ellipsoid, mucronate, grooved and coarsely reticulate, about 1 cm. long, dark brown when dry; seeds obovoid-globose, pitted 3. *djalonis*
- Flowers pedicellate:
- Bracts subtending the flowers large, longer than the pedicels, about 8 mm. long, acutely acuminate; leaves narrowly linear-oblongate, up to 35 cm. long and 2 cm. broad, closely nerved with about 25 nerves on each side of the midrib; perianth about 1.3 cm. long; fruits 1.2 cm. long, closely transversely ribbed 4. *korrowalense*
- Bracts much smaller:
- Perianth over 1 cm. long; segments with broad hyaline margins; leaf-sheaths transversely barred with purple towards the base; leaves broadly linear, up to nearly 1 m. long, very closely nerved; fruits about 7 mm. long, closely transversely ribbed; bracts gradually pointed 5. *speciosum*
- Perianth about 6 mm. long, nervose; leaf-sheaths not barred; leaves about as long as the panicle, closely nerved; fruits broadly obovoid, 5 mm. long, coarsely transversely ribbed; bracts broadly ovate, caudate-acuminate 6. *limosum*
- Peduncle not winged:
- Pedicels jointed near the base:
- Leaf-sheaths glabrous on the margin:
- Leaf-sheaths not mottled; leaves 1.5 mm. broad, 8 cm. long, closely nerved, minutely ciliate; racemes simple, as long as the leaves, few-flowered; pedicels 5 mm. long; perianth 3.5 mm. long; capsule transversely ribbed, about 5 mm. broad 7. *Warneckei*
- Leaf-sheaths mottled towards the base; leaves 5 mm. broad, strongly ribbed with nerves; panicle slender; pedicels very short; perianth 1 cm. long; fruit 6 mm. long, transversely ribbed 8. *Dalzielii*
- Leaf-sheaths bristly-ciliate on the margin, mottled; blade narrowly linear, curved, about 10 cm. long, minutely ciliate; raceme about 15 cm. long; bracts ovate, subulate-acuminate, purplish, 4 mm. long; perianth 8 mm. long 9. *tuberiferum*
- Pedicels jointed nearest the middle:
- Leaves broadly linear, about 1 cm. broad, with spaced nerves, about 25 cm. long; panicle slender; pedicels 1-1.5 cm. long in fruit; perianth 1 cm. long; fruit about 7 mm. long, transversely ribbed; seeds black, closely pitted 10. *caulescens*
- Leaves linear, about 5 mm. broad, very closely nerved; racemes simple or sub-simple; pedicels 1 cm. long; perianth 1 cm. long; fruit 5 mm. long, with a few transversely oblique ribs 11. *fibrosum*
- Pedicels jointed at the top:
- Pedicels 4 mm. long in flower, elongating to 1 cm. in fruit; bracts membranous, very broadly ovate, 6 mm. long; leaves about 25 cm. long and 1 cm. broad, closely nerved, glabrous on the margin; fruit 1 cm. long and broad, faintly transversely nerved 12. *articulatum*
- Pedicels about 2 mm. long in flower; bracts linear-lanceolate, pectinate-ciliate; leaves about 20 cm. long and 5 mm. broad, closely nerved and markedly ciliate; buds broadly ellipsoid, slightly apiculate 13. *deflexum*

1. *Anthericum pubirachis* Baker—F.T.A. 7: 481. *A. pendulum* Engl. & Krause. *A. Ledermannii* Engl. & Krause. *Dasytachys graminea* A. Chev. Rhizome horizontal; racemes shorter than the leaves.
French Guinea: Kouroussa! Dahomey: Atacora Mts., 1,200 ft. (June)! N. Nigeria: Nupe! Also in French Cameroons, Shari District and S. Rhodesia. Exsicc.—Barter. Pobéguin 293. Chev. 24010.
2. *A. limbamenense* Engl. & Krause in Engl. Bot. Jahrb. 45: 126 (1910).
N. Nigeria: plain between Bukuru and Hepharn, 4,300 ft. (July)! Also in French Cameroons. Exsicc.—Lely 350; P. 354.
3. *A. djalonis* A. Chev. Bot. 648, name only.
French Guinea: Futa Jallon; Dalaba Diaguissa plateau, 3,000-4,000 ft. (fr. Sept.-Oct.)! Exsicc.—Chev. 12852; 18859.
4. *A. korrowalense* Engl. & Krause in Engl. Bot. Jahrb. 45: 125 (1910). *A. atacorensis* A. Chev. Bot. 648.
Herb about 1 ft. high; roots numerous, thick; rhizome crowned with fibrous bristles.
Dahomey: Atacora Mts.; Somba country, 1,200-1,800 ft. (June)! N. Nigeria: near Keana! Wana, 1,700 ft. (June-Aug.)! Yola (Oct.)! Extends to French Congo. Exsicc.—Chev. 24219. Hepburn 56; 111. Shaw 97.
5. *A. speciosum* Rendle—F.T.A. 7: 486. *A. koutiensis* A. Chev. Bot. 648. About 2 ft. high; leaf-sheaths transversely mottled; flowers white, sweet-scented.
French Sudan: Mossi (Aug.)! Dahomey: Atacora Mts.; Somba, 1350-1,600 ft. (June)! N. Nigeria: Bauchi Plateau (June)! Liruwen-Kano Hills! Neill's Valley, 2 miles east of Naraguta (June)! Extends to Eastern Sudan and East Africa. Exsicc.—Lely 258; P. 332. Carpenter. Chev. 24058; 24635.
6. *A. limosum* Baker—F.T.A. 7: 482. *A. usseramense* var. *occidentalis* A. Chev. Bot. 648. *Chlorophytum nigrum* A. Chev. Bot. 651, name only.
French Sudan: Gourma (July)! French Guinea: Ditinn (Apr.)! Timbo (Apr.)! Kindia (May)! Dindina! Kora R.! Sierra Leone: Kuntida, Falaba (Mar.)! Matawba! Kanika! Ivory Coast: Mt. Douru, 2,300 ft. (May)! N. Nigeria: Yola (May)! Vom, Bauchi Plateau, 3,000-4,500 ft.! Also in

- French Cameroons and Angola. Exsicc.—*So. Elliott* 5203. *Thomas* 2087. *Glanville* 28. *Dalz.* 235. *Dent-Young* 250. *Chev.* 12180; 13271; 13542; 21744; 24329; 24440. *Pobéguin* 61.
7. **A. Warnecke** *Engl. Bot. Jahrb.* 32: 91. Root tuberous, tubers narrow and elongated; flowers white. French Guinea: Toumanea! Gold Coast: Accra, garden weed (Mar.)! Achimota, on club grass-lawns (May)! Togo: Lome! Exsicc.—*Deighton* 584. *Pobéguin* 1116. *Irvine* 1771. *Warnecke* 304.
8. **A. Dalzielii** *Hutch.* in *Kew Bull.* 1936: ined. Up to 2 ft. high; rhizome with a dense tuft of fibres at the top; petioles mottled; flowers white. N. Nigeria: Katsina Ala; abundant in dry places (June)! near Keana, in swampy places! Bukuru (July)! Exsicc.—*Dalz.* 854.
9. **A. tuberiferum** *Hutch.* in *Kew Bull.* 1936: ined. N. Nigeria: Rauchi Plateau; Vom, 3,000–4,500 ft.! Exsicc.—*Dent-Young* 251.
10. **A. caulescens** *Baker*—*F.T.A.* 7: 485. Root tuberous; flowers dull green. French Guinea: Timbo (Aug.)! Tita (July)! N. Nigeria: Nupe, in dry rocky soil! Exsicc.—*Barter* 1515. *MacLaud* 89. *Pobéguin* 2176.
11. **A. abrossum** *Hutch.* in *Kew Bull.* 1936: ined. Roots tuber-like; rhizome like a corm, with thread-like fibres at the top. N. Nigeria: Lokoja and Zungeru, common in dry season in rocky places in the bush (Jan.)! Yola (fr. Feb.)! Exsicc.—*Dalz.* 230; 261.
12. **A. articulatum** *Hutch.* in *Kew Bull.* 1936: ined. In wet places, 3 ft. high; flowers white, with green midrib on the segments. N. Nigeria: Jira (May)! Naraguta (Nov.)! Exsicc.—*Lely* 127; 690.
13. **A. deflexum** *A. Chev. Bot.* 648.¹ French Sudan: between Banankalldoro and Bama (June)! Exsicc.—*Chev.* 938.

3. NOTOSCEPTRUM Benth.—*F.T.A.* 7: 454.

- Leaves in a basal tuft and forming a cylindrical “tube” at the base, linear, up to 60 cm. long and 1.5 cm. broad, glabrous except the minutely scabrid margin, closely nerved; spike stout, about 60 cm. long, the upper two-thirds bearing the subsessile flowers, the latter rather dense; bracts boat-shaped, soon reflexed, 6 mm. long, scabrid on the margin; perianth campanulate, 1 cm. long, 6-lobed, lobes half as long as the tube, obtusely triangular, 1-nerved to the base of the tube; ovary broadly ovoid, glabrous; style entire, a little longer than the ovary *reflexum*
- N. reflexum** *Hutch.* in *Kew Bull.* 1936: ined. A tall herb like a “poker-plant,” with small yellow gamophyllous flowers on a stout peduncle about $\frac{1}{2}$ in. thick; bracts soon reflexed. S. Nigeria: Cameroons; Lakon, Bamenda, 6,000 ft., in considerable numbers in the grass on plateau (Apr.)! Exsicc.—*Mailland* 1624.

4. CHLOROPHYTUM Ker—*F.T.A.* 7: 493.

- Leaf-blade ovate-elliptic or ovate-lanceolate, rather abruptly narrowed into a long petiole as long or longer than the blade itself, the blade acutely acuminate; Leaves 15–20 cm. long, 6–8 cm. broad, with about 20 parallel nerves; inflorescence branched, as long as or longer than the leaves; bracts ovate, acuminate, 5 mm. long; pedicels 6 mm. long, jointed in the middle; perianth 6 mm. long, segments linear; capsule broader than long, about 8 mm. long, deeply 3-lobed; seeds small, black 1. *orchidastrum*
- Leaves 6–7 cm. long, 2–3 cm. broad, with about 10 parallel nerves; inflorescence simple, as long as the leaves; bracts ovate, about 2 mm. long; pedicels 3–4 mm. long, jointed near the top; capsule about 3 mm. long; seeds black, flat 2. *Bailloudii*
- Leaf-blade linear to oblanceolate, if ovate then sessile, or if petiolate then gradually narrowed to the base:
- Leaves shortly pectinate-ciliate:
- Leaves linear-lanceolate, the sheath often nearly as broad as the blade, the latter about 2.5 cm. broad, with about 25 parallel nerves; inflorescence racemose; bracts callous at the base, subulate-lanceolate, 7 mm. long; perianth 7 mm. long; capsule suborbicular, about 1 cm. diam. 3. *blepharophyllum*
- Leaves lanceolate to linear-lanceolate, narrowed into a false petiole, 15–30 cm. long, 2.5–4.5 cm. broad; inflorescence subcapitate, with very short peduncles; bracts closely ribbed 4. *subcapitatum*
- Leaves not ciliate:
- Leaves ovate or ovate-lanceolate, sessile, 5–10 cm. long, 2–4 cm. broad, with about 20 parallel nerves; inflorescence very short and subsessile in the cluster of leaves 5. *pusillum*
- Leaves oblong-linear to broadly oblanceolate:
- Leaves with a distinct narrow petiole between the blade and basal sheath:
- Leaves lanceolate or oblanceolate, 2 cm. or more broad:
- Fruits as long as or longer than broad, longitudinally broadly elliptic, 8 mm. long or more; axis of inflorescence and bracts minutely scabrid; pedicels jointed about the middle; perianth about 8 mm. long; leaves broadly oblanceolate, very acute, up to 30 cm. long and 4 cm. broad, with about 9 parallel nerves on each side of the midrib 6. *inornatum*
- Fruits suborbicular, broader than long, about 5 mm. diam.; leaves with about 6 lateral nerves on each side of the midrib:
- Axis of inflorescence minutely scabrid, usually longer than the leaves, few-

¹ In Chevallier's herbarium certain Shari specimens are included in this, but they are not the same, the leaves being ciliate.

flowered; pedicels jointed in the middle; leaves oblanceolate, very acute, thin, about 20 cm. long and 3-4 cm. broad 7. *sparsiflorum*
 Axis of inflorescence smooth:

Pedicels jointed nearest the apex, about 5 mm. long; leaves as in preceding 8. *togoense*

Pedicels jointed below the middle, over 1 cm. long 9. *nzii*
 Leaves linear to lanceolate, up to 3 cm. broad:

Leaves linear or narrowly linear-oblanceolate, very gradually narrowed to the base, 10-15 cm. long, up to 1.5 cm. broad, thin, with about 5 parallel nerves on each side of the midrib; racemes very slender, shorter than the leaves 10. *laxum*

Leaves lanceolate, rather abruptly narrowed into the petiole, the blade 8-12 cm. long, 2-3 cm. broad, rather obtuse; pedicels jointed about the middle 11. *alimifolium*

Leaves gradually narrowed into the basal sheath, without a distinct petiole between the blade and sheath:

Inflorescence sessile in the rosette of broadly oblanceolate sessile leaves, the latter not acuminate, 9-15 cm. long, 3-5 cm. broad, with an entire hyaline margin, with about 25 parallel nerves; bracts with hyaline margins; flowers seen only in bud 5. *pusillum*

Inflorescence not sessile:

Leaves oblanceolate, broadest above the middle, gradually acuminate:

Inflorescence stiff, a spike of shortly pedunculate clusters; pedicels at length jointed at the apex 12. *macrophyllum*

Inflorescence a very slender panicle:

Pedicels jointed below the apex, very short; perianth about 4 mm. long 13. *gallabatense*
 Pedicels jointed about the middle, about 1 cm. long; perianth 7 mm. long 14. *inundatum*

Leaves lanceolate or linear, broadest at or below the middle:

Leaf-blade much broader than the basal sheath:

Inflorescence about one-third as long as the leaves, a continuous dense raceme about 8 cm. long 15. *stenopetalum*

Inflorescence much longer than the leaves, a slender interrupted raceme 16. *destelium*

Leaf-blade as broad or narrower than the basal sheath, gradually narrowed to the apex, up to 25 cm. long:

Leaves 1.5 cm. broad; perianth 2 cm. long, the segments rather broad; pedicels jointed in the middle; capsule oblong-elliptic, 1.3 cm. long 17. *tuberosum*
 Leaves under 1 cm. broad:

Perianth 4 mm. long; pedicels short, jointed above the middle; capsule broader than long, small, strongly nerved 18. *polystachyum*

Perianth about 1 cm. long; pedicels jointed below the middle, about 1.5 cm. long; capsule about as broad as long, 7 mm. diam.; leaves sometimes reduced to sheaths. 19. *guineense*

1. *Chlorophytum orchidastrum* Lindl.—Bot. Reg. t. 813 & F.T.A. 7: 500. *C. petiolatum* Baker—F.T.A. 7: 500. *C. lanceum* A. Chev. Bot. 651. A stemless herb with woolly-tomentose roots, and lax panicle of small greenish flowers.

French Guinea: Faranana! Guerze's country! Sierra Leone: Mt. Gonki, Talla Hills (fr. Feb.)! York Pass (Mar.)! Liberia: Gbanga (Sept.)! Ivory Coast: various localities! N. Nigeria: Dekina (fr. June)! S. Nigeria: Owby (Dec.)! Oban! Cameroons Mt., 2,000 ft. (Dec.)! Barombi! Exsicc.—*Sc. Elliot* 4995. *Lane-Poole* 462. *Holland* 168. *Talb.* 731. *Elliot* 248. *Mann* 2132. *Preuss* 191. *Chev.* 15502; 20608, etc. *Linder* 637.

2. *C. Baillandii* A. Chev. Bot. 649, name only.

Ivory Coast: various localities! Exsicc.—*Chev.* 15498, etc.

3. *C. blepharophyllum* Schweinf.—F.T.A. 501. *C. ciliatum* Baker—F.T.A. 7: 505; *Chev.* Bot. 649. *C. Kerstingii* Dammer. Flowers dark purple or brown.

French Sudan! Sierra Leone: near Sulimania, 3,500 ft. (Mar.)! Makunde (fr. Apr.)! Pendembu (July)! Sendugu! Dahomey: Tangou confluence! N. Nigeria: Abinsi! Zelau, 3,200 ft.! Also in Eastern Sudan and East Africa. Exsicc.—*Sc. Elliot* 5306; 5703. *Kersting* 314. *Thomas* 635; 779. *Chev.* 24295, etc. *Dalz.* 851; 852. *Lely* 113. *Pobéguin* 414; 1590; 1902.

4. *C. subcapitatum* Hutch. in *Kew Bull.* 1936: ined. *C. Afzelii* A. Chev. Bot. 649, not of Baker.

French Sudan: Mossi (Aug.)! Ivory Coast: Toura (May)! Dahomey: Tangou (June)! Exsicc.—*Chev.* 21755; 24297; 24890. *Pobéguin* 305.

5. *C. pusillum* Schweinf. ex Baker—F.T.A. 7: 502. *C. mossicum* A. Chev. Bot. 651. *C. gourmacum* A. Chev. Bot. 650, partly. Very dwarf and forming a thick mat on the ground; flowers white.

French Sudan: Mossi (Aug.)! Gourma Prov. (July)! Kouroussa! N. Nigeria: Kilba Hills, on moist rocks (fr. Aug.)! Naraguta, 4,000 ft. (May)! Also in Eastern Sudan. Exsicc.—*Dalz.* 224. *Lely* 248. *Chev.* 24108; 24202.

6. *C. inornatum* Gaul. in *Bot. Mag. t.* 1071; F.T.A. 7: 499; *Chev.* Bot. 650. *C. Afzelii* Baker—F.T.A. 7: 496; *Chev.* Bot. 649. *C. bracteatum* Hua? *C. baouense* A. Chev. Bot. 649. *C. cavallense* A. Chev. Bot. 649. Herb about 1-1½ ft. high; flowers greenish-white; roots with small tubers.

French Guinea: Futa Jallon: between Mamou and Trebeleya (Sept.)! Sierra Leone: Wallia, under trees (fr. Jan.)! Pendembu (July)! Ronietta (fr. Nov.)! Makump (fr. Oct.)! Ivory Coast: various localities! Gold Coast: Aburi! S. Nigeria! Exsicc.—*Sc. Elliot* 4642. *Chev.* 18615, 20020, 22264. *Thomas* 867, 1762, 5548. *Deighton* 1287. *Johnson* 869. *Irvine* 876. *MacLaud* 92.

7. *C. sparsiflorum* Baker—F.T.A. 7: 498. *C. Grevenii* Engl. & Krause. *C. visiparum* and var. *maritimum*



FIG. 295.—*CHLOROPHYTUM ORCHIDASTRUM* Lindl. (LILIACEAE).
A, calyx and pistil. B, stamen. C, pistil. D, capsule. E, seeds.

- A. Chev. Bot. 652, names only. Herb about 1½ ft. high with very thin leaves and slender racemes of green and white flowers.
- Ivory Coast: Cavally basin (July)! 'Sanvi Assinié (Apr.)! Cameroons Mt.; forest, 4,000–5,000 ft. (Feb.)! Fernando Po! Exsicc.—Mann 388. Dalc. 8345. Chev. 17886; 19602. Grewen.
8. *C. togoense* Engl. Bot. Jahrb. 32: 92. *C. Talbotii* Rendle in Cat. Talb. Nig. Pl. 113. *C. toumodiense* A. Chev. Bot. 652. *C. Fosteri* A. Chev. Bot. 650, name only. Inflorescence and fruits drying black, in shady places.
- Ivory Coast: Tounodi to Dimbokro (Aug.)! Togo: Jaggebach, near Misahöhe! Gold Coast: Afram Plains (Mar.)! N. Nigeria: Abinsi, in shady ravine (fr. June)! Wana, June! S. Nigeria: Olokemeji! Ikoyi woods, Lagos, in shady places (May)! Oban! Exsicc.—Johnson 703. Dalc. 849; 1285. Talb. 731. Chev. 14099; B.2252. Büttner 172; 665. Hepburn 117.
9. *C. nzii* A. Chev. Bot. 651.
- Ivory Coast: Baoulé Nord, Nzi valley (fr. July). Exsicc.—Chev. 22195.
10. *C. laxum* R.Br.—F.T.A. 7: 503. Flowers white in very slender racemes.
- Sierra Leone: Freetown in shade (Aug.)! Pendembu (July)! Roruku! Liberia: Grand Bassa! N. Nigeria: Nupe! Zungeru! Abinsi! Banks of Dago river near Zungeru (July)! Widely distributed in tropical Africa. Exsicc.—Deighton 1300; 2062. Thomas 843; 6759. Vogel 41. Barter 1514. Dalc. 236; 850. Elliot 10. Linder 1571.
11. *C. alismifolium* Baker—F.T.A. 7: 496. Roots tuberous; flowers white.
- Sierra Leone: Makump, amongst stones near river! Liberia: Gbanga (Sept.)! S. Nigeria: Oban! Extends to Gabon. Exsicc.—Deighton 1954. Talb. Linder 647.
12. *C. macrophyllum* Aschers.—F.T.A. 7: 498; Chev. Bot. 651. Flowers white, fragrant; leaves in a rosette.
- Ivory Coast: various localities! N. Nigeria: Nupe, by rivulets! Naraguta, 4,000 ft. (May)! Zungeru shady ravines (June)! Mt. Patdi, Lokoja (fr. Nov.)! Widely distributed in tropical Africa. Exsicc.—Barter 1513. Dalc. 223; 274. Lely 245.
13. *C. gallabatense* Schweinf.—F.T.A. 7: 504; Chev. Bot. 650. *C. andongense* A. Chev. Bot. 649, not of Baker. Like the last, but with a slender panicle and narrower leaves.
- French Sudan: Gourma (July)! French Guinea: Kouroussa! Farana (May)! Also in Shari country, to Eritrea and in East Africa. Exsicc.—Chev. 13398; 13418; 15641: 24375. (See Appendix).
14. *C. inundatum* A. Chev. Bot. 651.
- French Guinea: Futa Jallon, 1,800–2,200 ft. (Sept.)! Exsicc.—Chev. 18328.
15. *C. stenopetalum* Baker—F.T.A. 7: 502; Chev. Bot. 652.
- N. Nigeria: Nupe! Exsicc.—Barter.
16. *C. Deistelianum* Engl. & Krause in Engl. Bot. Jahrb. 45: 134.
- French Sudan: Gourma (July)! Birni! Cameroons Mt.: Buea! Exsicc.—Deistel 649. Chev. 24470.
17. *C. tuberosum* Baker—F.T.A. 7: 503. Roots a bunch of slender tubers; inflorescence shorter than the leaves.
- N. Nigeria: Katagum distr.! Yola! Also in Eastern Sudan and South India. Exsicc.—Dalc. 234a; 235.
18. *C. polystachyum* Baker—F.T.A. 7: 509.
- French Sudan: Gourma (July)! Also in Eastern Sudan. Exsicc.—Chev. 24379.
19. *C. guineense* A. Chev. Bot. 650.
- French Guinea: Teliko! Grandes Chutes (fr. Dec.)! Sierra Leone: Scarcies, near Wallia (Feb.) Exsicc.—Pobeguin 1120. Chev. 20218. Scott-Elliott 4584.

5. DASYSTACHYS Baker—F.T.A. 7: 510.

Bracts pectinate-ciliate, linear from a broader base, about 1 cm. long; flowering part of racemes about 35 cm. long; rhachis very slightly pubescent; perianth 1 cm. long, segments oblong-lanceolate; leaves up to about 45 cm. long and 2 cm. broad, ciliate, gradually narrowed into the broadly sheathing base, with about 25 closely parallel nerves 1. *senegalensis*

Bracts not ciliate, much broader and shorter than above, triangular-ovate, shortly acuminate; flowering part of raceme about 20 cm. long; perianth 1 cm. long; stamens exserted; leaves up to 20 cm. long, 1-5 cm. broad, with about 20 closely parallel nerves, ciliate 2. *atacorensis*

1. *D. senegalensis* Baker in Bull. Herb. Boiss. Ser. 2, 1: 782. *D. macinensis* A. Chev. Bot. 652, name only.
- French Sudan: South Macina; between Thou and Kiri (Aug.)! French Guinea: Kouroussa (Aug.)! Senegal: without loc.! Exsicc.—Chev. 24854. Lecard. Pobeguin 374.
2. *D. atacorensis* A. Chev. Bot. 652, name only. *D. Sombae* A. Chev. Bot. 652, name only.
- Dahomey: Atacora Mts.; Sombé country, 1,300–1,700 ft. (June)! Exsicc.—Chev. 24057; 24224.

6. ERIOSPERMUM Jacq.—F.T.A. 7: 470.

Tuber bulb-like or somewhat irregular in shape, crowned by the remains of the leaf-bases; leaves 2 or 3, long-petiolate, linear-lanceolate, acute at each end, about 15 cm. long and 1–1.3 cm. broad, markedly nerved, glabrous; raceme about 25 cm. long, slender; pedicels ascending, the lower up to 10 cm. long in fruit; perianth-segments about 8 mm. long, narrowly oblanceolate; capsule obovoid, 8 mm. long; seeds densely villous *abyssinicum*

E. abyssinicum Baker—F.T.A. 7: 471. *E. togoense* Dammer. *Hypoxis villosa* A. Chev. Bot. 635, partly, not of Linn.

French Sudan: near Bama (June)! between Simona and Toro (June)! Togo: Sokode-Basari, at Alédyo, about 2,400 ft. (Feb.). N. Nigeria: Nupe, summit of a rocky hill! Yola, sandy low ground (June)! Vom, Bauchi Plateau, 3,000–4,500 ft.! Extends to Eastern Sudan, East Africa, south to Nyasaland and Rhodesia. Exsicc.—Barter 1538. Dalc. 238. Dent-Young 255. Chev. 937; 978. Kersting 310.

7. ALOE Linn.—F.T.A. 7: 454.

About 1 m. high; leaves thick and fleshy, lanceolate, long-pointed, pale-green with white spots, up to about 45 cm. long and 8 cm. broad, coarsely spinous-repand-dentate, teeth about 1 cm. apart; inflorescence a sparsely branched panicle; bracts lanceolate, 3-ribbed and with thin margins, about 1 cm. long; pedicels 1-5 cm. long, jointed at the top; perianth red, tipped with green, 3 cm. long Barteri

A. Barteri Baker—F.T.A. 7: 464; Chev. Bot. 645; Holl. 704. *A. Büttneri* A. Berger. *A. edulis* A. Chev. French Sudan: Badinko (Jan.)! Folo (May)! Dioundiou (June)! Ivory Coa.; various localities!



FIG. 296.—*ERIOSPERMUM ABYSSINICUM* Baker (LILIACEAE).

A, flower. B, perianth-segment and stamen. C, stamens. D, pistil. E, opened capsule showing seeds. F, seed, with G. hairy covering removed.

Gold Coast: Accra Plains (Feb.)! N. Agogo, Ashanti! Togo: Kpeve Agricultural Station (Dec.)! Dahomey: Atacora Mts., 1,200-1,800 ft. (June)! N. Nigeria: Nupe! Abinsi! Yola (Nov.)! Pankshin, 5,100 ft. (July)! Vom! S. Nigeria: Lagos! Also in Ubangi-Shari. Exsicc.—Brown 928. Chipp 625. Howes 1073. Barter 1502. Dalziel 853. Shaw 63. Lely 433. Dent-Young 249. Millen 172. Büttner 24 (See Appendix).

8. URGINEA Steinh.—F.T.A. 8: 536.

Bracts very small and early caducous:

Flowering stems elongated, few-flowered; leafless at flowering time; bracts minute and early caducous; pedicels slender, about 3 cm. long, not jointed; perianth 1.5 cm. long, segments shortly connate at the base; capsule 2 cm. long; seeds suborbicular, flattened, winged, about 6 mm. diam. 1. *indica*

Flowering stems very tall, leafless, terminating in a long raceme with numerous flowers; bracts small and linear, early caducous; pedicels spreading, persistent, 1.5 cm. long, slender, at length jointed at the top; perianth about 7 mm. long; segments shortly united at the base; capsule depressed-globose in outline, deeply 3-lobed, about 1.3 cm. broad; seeds flattened, black and shining, broadly obovate, 6 mm. long 2. *altissima*

Bracts persistent and conspicuous:

Racemes several- to numerous-flowered, elongated:

Perianth about 2 cm. long; flowering stems with 2 or 3 narrowly linear or lanceolate

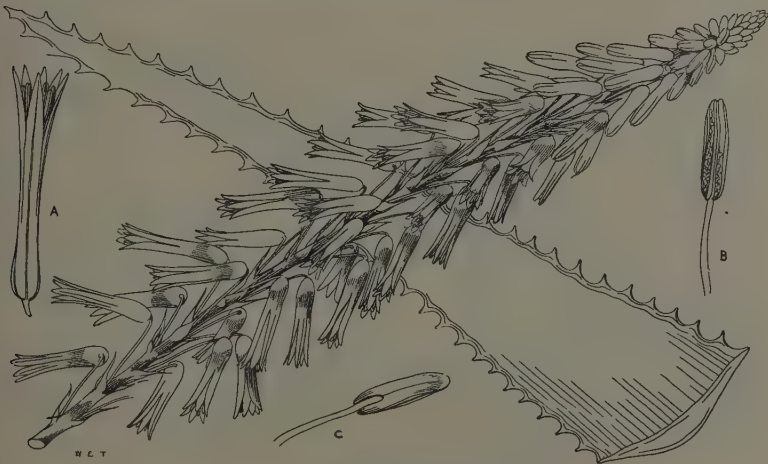


FIG. 297.—*ALOE BARTERI* Baker (LILIACEAE).

A, flower. B, stamen. C, same, back view.

leaves at the base, several-flowered; bracts persistent, linear-lanceolate, acuminate, 1-1.5 cm. long; pedicels about 1 cm. long, persistent and at length jointed at the top, reaching 2 cm. in fruit; perianth-segments free to the base, with broad hyaline margins; capsule ellipsoid, about 2 cm. long, obliquely nerved; seeds black, oblong-elliptic, somewhat flattened, about 7 mm. long . . . 3. *nigritana*

Perianth about 1 cm. long:

Leaves narrowed to the sheathing ciliate base, narrowly linear, 15-20 cm. long; racemes several-flowered; bracts linear, 8 mm. long; pedicels 5 mm. long; capsule slightly longer than broad, subacute, 1 cm. long . . . 4. *mankonensis*

Leaves with a broad sheathing eciliate base, broadly linear, about 15 cm. long; racemes several-flowered; bracts persistent, narrowly lanceolate, acute, about 8 mm. long, with broad hyaline margins; pedicels 6 mm. long, persistent, jointed at the top; perianth 8 mm. long, segments free to the base, with very broad hyaline margins; capsule rounded at the apex, broader than long, 1 cm. long; seeds flattened, obliquely oblong-elliptic, 7 mm. long, black . . . 5. *narcissifolia*

Racemes 2-4-flowered, very short; bracts linear, 7 mm. long; pedicels 6 mm. long; perianth-segments 7 mm. long, oblong-linear, with thin margins . . . 6. *pauciflora*

1. *Urginea indica* Kunth—F.T.A. 7: 540; Chev. Bot. 655; Holl. 709. Flowers dull green.

Senegal! French Guinea! French Sudan! Sierra Leone: Lomaburn, common on syenite rocks (fr. Feb.)! At foot of Gonkwi Mtn., Dunnia (Feb.)! Wallia (Feb.)! Karina, N. Prov. (Feb.)! Gold Coast:

without loc. ! Togo : near Lome ! Dahomey : Zagnanado Circle ! N. Nigeria : Nupe ! Abinsi, common in the bush (Apr.) ! Narsuta ! Also in Eastern Sudan, E. Africa and in India. Exsicc.—*Sc. Elliot* 4572 ; 4817 ; 5019. *Morson*, *Thomas* 8714. *Glanville* 161. *Irvine* 613. *Warnecke* 94. *Barter* 1099. *Dalz.* 855. *Hill* 35. (See Appendix).

2. *U. altissima* Baker—F.T.A. 7 : 538 ; Chev. Bot. 655 ; Holl. 709. *Ornithogalum altissimum* Linn. f. *O. giganteum* Jacq. Hort. Schoen. t. 87. *Drimia altissima* Gawl. in Bot. Mag. t. 1074. *D. Barteri* Baker—F.T.A. 7 : 526 ; *Urginea micrantha* Solms—F.T.A. 7 : 537 ; Chev. Bot. 656.

Widely spread in savannah country from the French Sudan to Southern Nigeria ; extending to Eastern Sudan through East Africa to South Africa. Exsicc.—Chev. 236. *Sc. Elliot* 6537. *Burbridge* 541. *Williams* 64. *Johnson* 618. *Barter* 1183 ; 8432. *Dalz.* 385 ; 442. *Thorneill* 91. *Hepburn* 60. *Talb.* 786. *Lely* P. 210. *Dent-Young* 254. *Rovland.* *Pobéguin* 108 ; 1121. (See Appendix).

A flowering specimen without leaves collected by *Migeod* (No. 353) above Bamenda, S. Nigeria, resembles this species but may be *U. psilostachya* Welw., recorded from the Congo and Angola.

3. *U. nigritana* Baker—F.T.A. 7 : 542. *Albuca purpurascens* and *A. sudanica* A. Chev. Bot. 655, names only. Leaves appearing after the flowers.

French Guinea : various localities ! French Sudan : Negala and Dio ! Sierra Leone : on paths, Falaba (Mar.) ! Ivory Coast : south of Touba (July) ! Gold Coast : common near Kintampo (Mar.) ! Dahomey : Zagnanado Circle (Feb.) ! N. Nigeria : Nupe, common in open plains from Ijaye to Ilorin ! Jeba ! Kontagora (Jan.) ! Bukuru (July) ! Naraguta ! Randa, 2,000 ft. ! Bauchi (Feb.) ! S. Nigeria : interior of Western Lagos ! Also in East Africa. Exsicc.—*Sc. Elliot* 5171 ; 5289. *Collenette* 57. *Dalz.* 78 ; 258. *Barter* 3335. *Lely* 26 ; 480 ; P. 165. *Hill* 34. *Hepburn* 59. *Rovland.* Chev. 12537, etc. (See Appendix).

4. *U. mankonensis* Hutch. in Kew Bull. 1936 : ined. *Albuca mankonensis* A. Chev. Bot. 654, name only. Ivory Coast : Mankona Circle (June) ! Exsicc.—Chev. 21871.

5. *U. narcissifolia* Hutch. in Kew Bull. 1936 : ined. *Albuca narcissifolia* A. Chev. Bot. 654, etc. in Bull. Soc. Bot. Fr. Mém. 8 : 92. *A. sudanica* var. *gracilis* A. Chev. Bot. 655, and *A. sassandrensis* A. Chev. l.c., names only. Bulb large, about 2 in. in diam. ; racemes about 1½ ft. long.

French Guinea : Futa Jallon ! Ivory Coast : Upper Sassandra, Toura country, on top of Mt. Dowrou,



FIG. 298.—*URGINEA ALTISSIMA* Baker (LILIACEAE).

A, flower. B, stamen. C, fruit.

3,400 ft. (May) ! Dahomey : Allada Circle (Mar.) ! between Savalou and Gouka (May) ! N. Nigeria : Yola, in bush, near marshes (July) ! Katagum ! Abinsi (Apr.) ! Exsicc.—*Dalz.* 233 ; 234 ; 236 ; 856. *Lugard.* Chev. 12932 ; 21726 ; 23261 ; 23720.

6. *U. pauciflora* Baker—F.T.A. 7 : 539 ; Chev. Bot. 656.

French Guinea : Labé, 3,100 ft. (Apr.) ! Sierra Leone : dry burnt places near Wallia (Feb.) ! Exsicc.—*Sc. Elliot* 4580. Chev. 12530.

9. DRIMIOPSIS Lindl.—F.T.A. 7 : 542.

Leaves ascending, linear-lanceolate, up to 20 cm. long and 2 cm. broad, with spaced parallel nerves, margins subhyaline ; inflorescence long-pedunculate, spicate, the flowers subsessile on the axis ; perianth campanulate, about 3.5 mm. long ; seeds black *Barteri*

- D. *Barteri* Baker—F.T.A. 7 : 543 ; Chev. Bot. 656. *D. aroidastrum* A. Chev. *Drimia Barteri* A. Chev. Bot. 653, not of Baker.

French Guinea : Balé valley, near Bendougou (May) ! Faranna (Apr.—May) ! Dahomey : Djougou Circle (May) ! N. Nigeria : Nupe ! Plains of Ilorin ! Yola, damp places in bush (Apr.) ! Sokoto (June) ! Lokofa (Apr.) ! Nada Hills ! Also in French Cameroons and Shari. Exsicc.—Chev. 13167 ; 13196 ; 13422 ; 23842. *Barter* 1512 ; 3449. *Dalz.* 236 ; 541. *Parsons* L. 114. *Hepburn* 79.

10. ALBUCA Linn.—F.T.A. 8 : 528.

Leaves elongate-linear, about 1.5 cm. broad, glabrous ; flowering stem up to 1.5 m. high ; flowers several ; bracts persistent, tailed-acuminate from an ovate-lanceolate



FIG. 299.—*DRIMIOPSIS BARTERI* Baker (LILIACEAE).

A, two flowers. B and C, perianth-segments and stamens. D, pistil. E, capsule and seed.

base, 2.5–4.5 cm. long, many-nerved; pedicels about 7 mm. long, persistent and jointed at the top; perianth 2.5 cm. long, segments free to the base, with broad thin margins; capsule ovoid, 2 cm. long., transversely nerved; seeds black, angular, 6 mm. long *abyssinica*

A. abyssinica Dryand—F.T.A. 7: 533. Flowers pendulous, bright yellow; raceme 4–5 ft. high; common in marshes.

N. Nigeria: Plains between Hephram and Ropp, 4,600 ft. (July)! Bauchi Plateau (July)! Mada Hills, 2,000 ft. (Aug.)! Also in N.E. Tropical Africa and Arabia. Exsicc.—Lely 380; P. 668. Hepburn 77.

11. IPHIGENIA Kunth—F.T.A. 7: 561.

Stems very flexuous, bearing 4–5 narrowly linear acute leaves about 10 cm. long with about 4 parallel nerves on each side of the midrib; flowers solitary; pedicels about 2 cm. long, at length elongating; perianth-segments free to the base, linear, 5–7 mm. long; fruit 1.2 cm. long, laterally lobed, slightly rugose *Ledermannii*

I. Ledermannii Engl. & Krause in Engl. Bot. Jahrb. 45: 123. *I. sudanica* A. Chev. Bot. 658, name only. Rootstock a small tunicated corm; flowering stem about 8 in. 1 ft. high.

French Sudan: Gourma Prov. (July)! Mossi (Aug.)! Also in French Cameroons. Exsicc.—Chev. 24490; 24675.

12. ANDROCYMBIUM Willd.—F.T.A. 7: 559.

Buried stem about 15 cm. long; leaves crowded, linear-lanceolate from a very broad base, about 12 cm. long, the margins minutely scabrid; perianth-segments about 3.5 cm. long, clawed, the limb oblong-lanceolate; anthers 3–4 mm. long

gramineum

A. gramineum Melchior in Contrib. Gray Herb. n.s. 53: 5 (1918). *Melanthium gramineum* Cav. (1801). *Erythrostictus punctatus* Schlecht.—Chev. Bot. 657. Leaves tufted on the surface of the soil, arising from a deeply buried tunicated corm.

French Sudan: Bilma, Sudanese Sahara (Jan.)! Also in N. Africa. Exsicc.—Chev. 28617.

13. SCILLA Linn.—F.T.A. 7: 548.

Pedicels 5–8 mm. long; raceme a little overtopping the leaves; perianth 5 mm. long; leaves about 15 cm. long, 1–1.5 cm. broad, about 6-nerved 1. *camerooniana*

Pedicels 2–3 mm. or rarely 4 mm. long; raceme usually much overtopping the leaves; perianth 4 mm. long; leaves about 8 cm. long or up to 15 cm., 6–8 mm. broad, closely nerved. 2. *picta*

Pedicels 2.5 mm. long or less; raceme very few-flowered, overtopping the leaves; perianth 3.5 mm. long; leaves up to 30 cm. long, about 1.5 cm. broad, very laxly 10-nerved; flowers lavender 3. *Berthelotii*

1. S. camerooniana Baker—F.T.A. 7: 554. *S. dahomensis* A. Chev. Bot. 657, name only.

Dahomey: between Savalou and Gouka (May)! S. Nigeria: Cameroons River (Jan.)! Also in French Cameroons. Exsicc.—Mann 728; 2230. Chev. 23719. (See Appendix).

2. S. picta A. Chev. Bot. 657, name only. *S. mankonensis* A. Chev. and *S. sudanica* A. Chev., l.c., names only. French Sudan: Karankasso (May)! Gourma (July)! Gambia, in woodlands (Mar.)! Ivory Coast: Mankona (June)! Gold Coast: Afram Plains (Mar.)! Sesiamang (Feb.)! N. Nigeria: Abinsi, abundant in flats (Apr.)! Bauchi Plateau (May)! Exsicc.—Chev. 902; 21871 bis; 24416. Brooks 60., Johnson 702. Dalt. 857. Lely P. 286. Thomas D131. (See Appendix).

3. S. Berthelotii Webb—F.T.A. 7: 550; Bot. Mag. t. 5308.

S. Nigeria: Cameroons R. ? Also in Canaries. Exsicc.—Mann (cult. in Hort. Kew).

14. DIPCADI Medic.—F.T.A. 7: 516.

Outer perianth-segments very narrow:

Bracts only a little longer than the pedicels, shortly acuminate, ovate-elliptic, 4 mm. long; perianth 1.3 cm. long; leaves as in the next species but shorter; racemes about 16 cm. long (in flower), few-flowered 1. *occidentale*

Bracts much longer than the pedicels, long-acuminate from a broad base, about 1.5 cm. long; pedicels about 7 mm. long; perianth 1.5 cm. long; leaves very few, elongate-linear, up to about 25 cm. long and 7 mm. broad, about 12-nerved, glabrous; raceme simple, slender, lax-flowered; capsule subglobose in outline, 3-lobed, about 1 cm. long; seeds black 2. *longifolium*

Outer perianth-segments ovate-lanceolate, 1 cm. long; bracts broadly ovate, acuminate, twice as long as the pedicels, the latter 2–3 mm. long; leaves about 10 cm. long; raceme about 15 cm. long and about 12-flowered; capsule 1 cm. long; seeds black

3. *gourmaense*

1. D. occidentale Baker—F.T.A. 7: 521; Chev. Bot. 654, incl. var. *pratensis* A. Chev. Bulb rather large, about 2 in. in diam.

French Guinea: Mamou (May)! between Toubor and Labé! Sierra Leone: near Wallia, Scarcies (Feb.)! Exsicc.—Sc. Elliot 4840. Chev. 13263; 13590. Pobéguin 2116.

2. D. longifolium Baker—F.T.A. 7: 519; Chev. Bot. 653. *D. dahomensis* A. Chev. Bot. 653. *D. filifolium* A. Chev. Bot. 653, not of Baker. *D. tucuzeanum* A. Chev. Bot. 654, not of Baker. *D. Kerstingii* Dammer. *Uropetalum longifolium* Lindl. in Bot. Reg. t. 974. Bulb at most 1½ in. in diam.

French Sudan: Timbuctu! French Guinea: Kadi! Gold Coast: Afram Plains (Mar.)! Dahomey: Savalou Circle, etc. (May)! N. Nigeria: Horin, abundant in the plains! Yola (Apr.)! Takwara, 3,200 ft.! Sokoto (June)! S. Nigeria: Lagos! Also in the Lower Zambesi and Eastern Rhodesia. Exsicc.—Johnson

707. *Barter* 3441. *Dalz.* 232; 443. *Lely* 118. *Rowland.* *Chev.* 23261 bis; 23738. *Pobéguin* 2076. *Kersting* 312.
 3. *D. gourmaense* A. *Chev.* Bot. 653, name only. Bulb $\frac{1}{2}$ in. diam.; leaves $\frac{1}{2}$ as long as the scape; flowers greenish.
 French Sudan: Gourma; Diapaga (July)! Exsicc.—*Chev.* 24422.

15. WURMBEA Thunb.—F.T.A. 7: 560.

Leaves 1 or 2, linear, acute, 6–9 cm. long, about 1.5 mm. broad, glabrous; membranous sheath around the base of the stem truncate, about 1.5 cm. long; spike 2-flowered, half as long as the leaf; perianth-segments shortly connate at the base, 6 mm. long, narrowly oblanceolate; anthers broadly ovate-elliptic, cordate at the base

tenuis

W. tenuis Baker—F.T.A. 7: 560. Rootstock a tunicated corm; flowering stem about 3 in. high; perianth white and purple.

Fernando Po: 9,000 ft. (Apr.)! Also in Cameroons. Exsicc.—*Mann* 1454.

16. DRIMIA Jacq.—F.T.A. 7: 525.

Leaves linear, acute, pilose-ciliate, very few present at flowering time (only 1 seen); leaf-bases persistent and purplish; racemes slender, about 40 cm. long, flowering in the upper third; flowers few (about 15); pedicels 3 mm. long; bracts linear-filiform, soon falling off; perianth 1.4 cm. long, segments connate in the lower half, linear, recurved; fruit 3-lobed, orbicular in outline, nearly 1 cm. diam., glabrous; seeds dark-coloured *incerta*

D. incerta A. *Chev.* Bot. 653, name only. Bulb about 2 in. long, 1 in. diam.; racemes elongated, slender. Ivory Coast: Upper Sassandra; Toura country, on Mt. Dourou, 3,000 ft. (May)! Gouékouma 2,500–2,800 ft. (May)! Exsicc.—*Chev.* 21656 bis; *Fleury* in *Herb. Chev.* 21733.

17. GLORIOSA Linn.—F.T.A. 7: 563.

Perianth-segments with very crisped-wavy margins, narrowly linear-lanceolate, 6–9 cm. long; leaves in whorls of 3, opposite or alternate, ovate-lanceolate, the blade about 8–10 cm. long and 4 cm. broad, ending in a long slender cirrhose tip; stamens shorter than the segments; anthers about 1.5 cm. long 1. *superba*

Perianth-segments with straight or only slightly wavy margins, broadly oblanceolate or almost obovate-oblanceolate, gradually narrowed to the base, up to 10 cm. long; leaves opposite or alternate, ovate-lanceolate, long-acuminate, the apex sometimes hardly tendriliform; anthers about 1 cm. long 2. *simplex*

1. *G. superba* Linn.—F.T.A. 7: 563; Bot. Reg. t. 77; Andr. Bot. Rep. t. 129; *Chev.* Bot. 658; *Holl.* 709. *G. virescens* A. *Chev.* Bot. 658, not of Lindl. Flowers red and yellow; always climbing. Fairly common in forest areas throughout the region and in tropical Africa and Asia generally; also in Northern Transvaal. (See Appendix).
 2. *G. simplex* Linn. Mant. 82 (1767). *G. caerulea* Mill. (1768). *G. virescens* Lindl. in Bot. Mag. t. 2539; F.T.A. 7: 563; *Holl.* 710; *Stept* 659. *G. Carsonii* Baker. *G. sudanica* A. *Chev.* *G. superba* var. *planipetala* Engl. Flowers greenish, turning yellow and red or pink; stem erect or climbing. Widely distributed in the area, more or less erect in the grassy plains, scandent in the bush and then with more tendril-like leaf tips; generally distributed in tropical Africa, Eastern South Africa and Madagascar. (See Appendix).

18. ASPARAGUS Linn.—F.T.A. 7: 425.

Flowers in racemes; cladodes flattish and more or less falcate:

Pedicels jointed above the middle, about 5 mm. long in flower; cladodes about 2 cm. long; spines only on the main shoots, short and recurved 1. *racemosus*
 Pedicels-jointed nearly at the base, about 5 mm. long in flower; cladodes about 4 cm. long, very minutely serrulate on the margin; spines stout and recurved on the main shoots 2. *Warneckei*

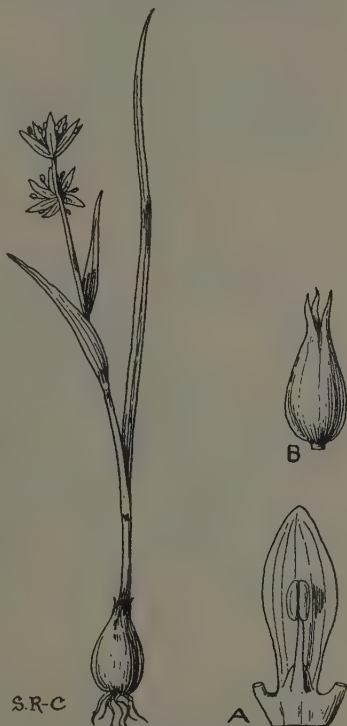


FIG. 300.—WURMBEA TENUIS Baker (LILIACEAE).

A, perianth-segment and stamen. B, pistil.

Flowers fasciculate; cladodes subulate or filiform, straight or nearly so:

Pedicels filiform:

Pedicels jointed near the base; flower-clusters subtended by short recurved spines; fruits pruinose, about 8 mm. diam.; habit climbing; cladodes subulate, stiff

3. *Pauli-Guilelmii*

Pedicels jointed above the middle, about 1.5 cm. long; flower-clusters subtended by very small inconspicuous spines; branches very slender; cladodes filiform, over 2 cm. long

4. *longipes*

Pedicels short and stout, jointed about the middle, about 3 mm. long:

Cladodes rigidly subulate, sharply angular; spines very short and curved from a broad base; berry fleshy, blackish when dry

5. *africanus*

Cladodes acicular, flattened; spines subulate, fairly long, nearly straight; berry much longer than the pedicel

6. *Schroederi*

1. *Asparagus racemosus* Willd.—F.T.A. 7: 434; Chev. Bot. 645. Flowers green, berries red. French Guinea: several localities! Sierra Leone: Kabala distr. (Feb.)! Konnoh country! Gold Coast: Akroful! Tropical Africa generally and in Tropical Asia. Exsicc.—Deighton 1873. Burbidge 488. Glanville 393. Cummins 31. Chev. 13619, etc. (See Appendix).
2. *A. Warneckei* Hutch. in Kew Bull. 1936: ined. *A. drepanophyllus* var. *Warneckei* Engl. A climber on shrubs in thickets; leafless at flowering time; flowers white or cream with strong sickly odour. French Guinea: Pita (Nov.)! Gold Coast: Accra-Dodowah Plains (Feb.)! Togo: near Lome! Exsicc.—Warnecke 28. Pobéguin. Irvine 1502. (See Appendix).



FIG. 301.—*ASPARAGUS AFRICANUS* Lam. (LILIACEAE).

A, cladode. B, pedicel. C, flowers and cladodes. D, open flower.

3. *A. Pauli-Guilelmii* Solms-Laub.—F.T.A. 7: 428, incl. var. *Daltoni* Baker. *A. africanus* A. Chev. Bot. 644, not of Lam. Several feet long, often twining over bushes; flowers white, fragrant. Common throughout the area and in Tropical Africa generally. (See Appendix).
Note.—*A. flagellaris* Baker (F.T.A. 7: 430) may be the same as this species. I have not found the type specimen in the Paris herbarium.
4. *A. longipes* Baker in Kew Bull. 1901: 134.
"Cameroons Mtns." without locality! Imported by Messrs. Sander, of St. Albans, and grown at Kew in Nov. 1898.
5. *A. africanus* Lam.—F.T.A. 7: 433. *A. gourmatus* A. Chev. Erect armed herb up to 5 ft. high; flowers white. Senegal! French Sudan: Gourma (July)! Gold Coast: Sissu, N. Province (fr. June)! N. Nigeria: Bauchi Plateau! Tropical Africa generally, also in S. Africa, Arabia and Socotra. Exsicc.—Heudelot 462. Chev. 24167; 24484. Chipp 494. Barton 1516. Lely 204. (See Appendix).
6. *A. Schroederi* Engl. Bot. Jahrb. 32: 97. Erect, 2-3 ft. high; flowers white. Togo: Sokode, 950 ft. (Mar.)! Dahomey: Atacora Mts.; 1,200-1,800 ft. (fr. June)! N. Nigeria: Katagum, Sokoto and Bauchi Plateau! Exsicc.—Schroeder 20. Chev. 24167. Dalz. 245; 444. Lely F. 212. Hill 23.

165. TECOPHILAEACEAE¹

(Cyanastraceae²)

Herbs with fibrous tunicated corms or thick orbicular flattened tubers. Leaves linear to ovate-orbicular and cordate. Flowers hermaphrodite, actinomorphic,

¹ Leybold in Bonplandia 10: 370 (1862); Hutchinson, Fam. of Flowering Plants 2: 102 (1934).

² Engl. in Engl. & Prantl Pflanzenfam. ed. II. 15a: 188 (1930).

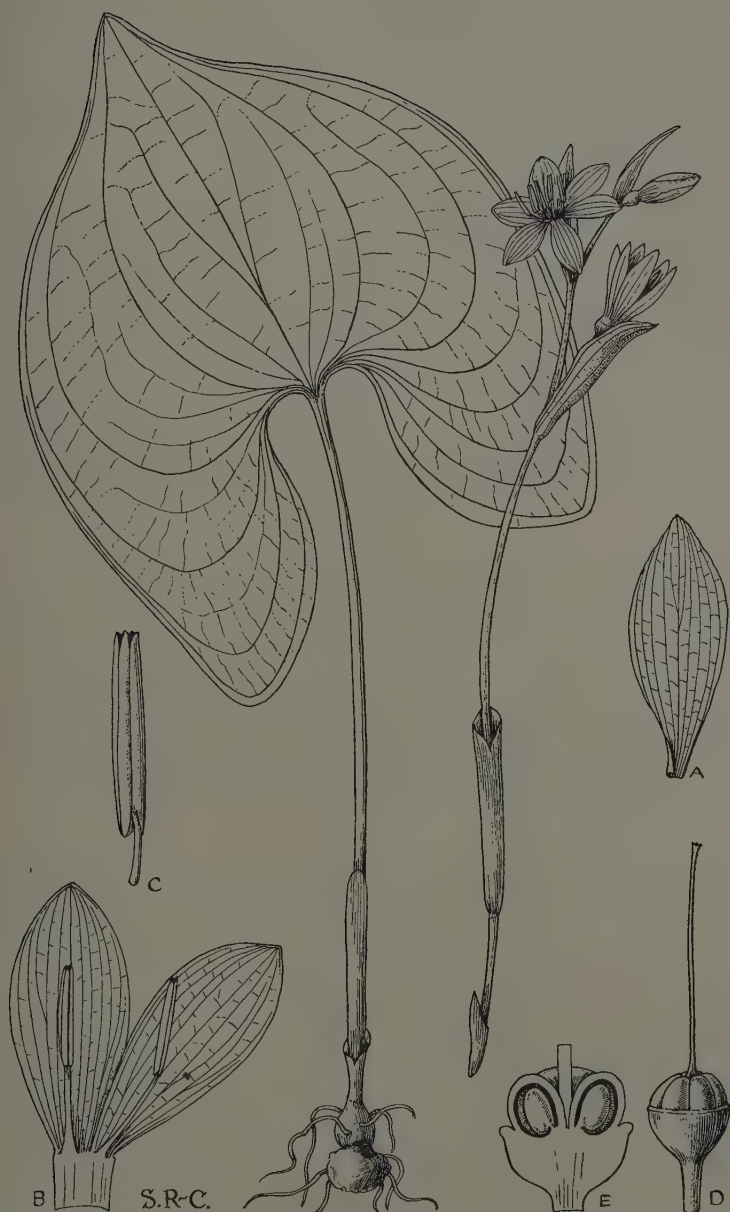


FIG. 302.—*CYANASTRUM CORDIFOLIUM* Oliv. (TECOPHILAEACEAE).

A, perianth-segment. B, two perianth-segments and stamens. C, stamen. D, pistil.
E, vertical section of ovary.

in simple racemes or in panicles; bracts large and membranous to small. Perianth-tube short or nothing; lobes 6, spreading or reflexed, subequal, imbricate. Stamens 6, perfect, or 3 and with 3 staminodes, inserted at the throat of the perianth; anthers 2-celled, the connective often produced at both ends, the base then swollen or spur-like, cells opening by a terminal pore, rarely by a slit. Ovary semi-inferior, 3-celled; style subulate or filiform. Ovules numerous, axile, 2-seriate. Fruit a loculicidal capsule. Seeds numerous, with fleshy endosperm.

Mainly Southern Hemisphere, especially S. Africa and Chile.

CYANASTRUM Oliv. in Hook. Ic. Pl. 20 : t. 1965 (1891).

Corms solid, depressed-globose, arranged in tiers, with few roots; leaves single from the corm, long-petiolate, very broadly ovate or ovate-orbicular, widely cordate at the base, acutely triangular at the apex, about 15 cm. long and up to 15 cm. broad, with numerous arcuate nerves radiating from the base and faint transverse parallel nerves; petiole up to 30 cm. long; flowering stems short, leafless, arising directly from the corm, clothed with a few membranous oblanceolate sheathing bracts; perianth with 6 equal spreading coralline obovate lobes; stamens 6, opposite the lobes; anthers linear, opening by terminal pores; ovary half inferior; fruit deeply 3-lobed. *cordifolium*

Cyanastrum cordifolium Oliv. in Hook. Ic. Plant. t. 1965 (1891); Engl. in Engl. & Prantl Pflanzenfam. ed. II. 15a : 189, fig. 72, J-M. *Schoenlandia gabonensis* Cornu. A herb in the rain-forest with bright blue flowers; stamens long-exserted, the anthers opening by pores; nerves of the leaves directed towards the apex. S. Nigeria : Ibadan (May)! Adeyanba (Apr.)! Oban! Sapoba! Amba Bay (Feb.)! Cross River! Mamfe! Likomba, in deep shade. Extends to Gabon. Exsicc.—Millson 89. Kallbreyer 89. Talb. 911 Kennedy 206. Mann 769. Rosevear 33x. Mildbr. 10583. (See Appendix).

166. PONTEDERIACEAE

Aquatic erect or floating herbs. Leaves with floating or immersed blades sheathing at the base. Flowers hermaphrodite, actinomorphic, arranged in racemes or panicles subtended by a spathe-like leaf-sheath; bracts minute or absent. Perianth hypogynous, corolline; lobes 6, sub-biseriate. Stamens 6 or 3, rarely 1, inserted on the perianth, sometimes 1 layer; filaments free; anthers 2-celled, opening lengthwise by slits or by pores. Ovary superior, 3-celled, with axile placentas or 1-celled with parietal placentas; style entire or shortly lobed. Ovules numerous to solitary and then pendulous. Fruit a capsule or indehiscent. Seeds ribbed, with copious endosperm.

Fresh water aquatics, in the tropics and subtropics.

Stamens 6 in the normal flowers :

Perianth-segments free to the base; leaves all alike 1. *Monochoria*
Perianth-segments partially united into a tube; submerged leaves linear, floating
ones ovate or ovate-orbicular 2. *Eichornia*

Stamens 3 in the normal flowers, sometimes 1 in the cleistogamous flowers; leaves all alike 3. *Heteranthera*

1. MONOCHORIA Presl—F.T.A. 8 : 5.

Basal leaves reduced to membranous sheaths; leaves narrowly lanceolate, acutely acuminate, about 6 cm. long and 1 cm. broad, narrowed into a false petiole about as long as the blade and expanded into a membranous sheath at the base; racemes at first embraced by the leaf-sheath, soon exserted, about 8-12-flowered; pedicels stout, 4 mm. long; perianth-segments oblong, about 1 cm. long, 6-7-nerved, with membranous margins; anthers subequal, but one larger, 4-5 mm. long; fruit enclosed by the persistent perianth *vaginalis* var. *plantaginea*

M. vaginalis var. *plantaginea* Solms in DC. Monogr. 4 : Pontederiac. 524. Aquatic with racemes of blue flowers; stamens 6.

Senegal : North Tambacounda (Nov.)! French Guinea : Kankan (Sept.)! Also in Eastern tropics. Exsicc.—Pobéguin 1107. Chev. 33965.

2. EICHORNIA Kunth—F.T.A. 8 : 4.

Herb; submerged leaves linear, 3-6 cm. long, floating ones long-petiolate, ovate to ovate-orbicular, cordate at the base, 1.5-2.5 cm. long, entire, minutely pustulate on the upper surface, with very numerous and close nerves below; flowers solitary; perianth 6-lobed; stamens 6 *natans*

E. natans Solms—F.T.A. 8:4; Chev. Bot. 659. *Pontederia natans* Beauv. Fl. Owar. 2:18, t. 68, fig. 2. Flowers blue; upper leaves floating.
 French Guinea! French Sudan! Sierra Leone: near Dantilla, Falaba (Mar.)! Southern Province, 400–500 ft. (Mar.)! near Giema (Apr.)! near Njala (Nov.)! Ivory Coast: Baoule Nord! N. Nigeria: Nupe! Zungeru, in pools (Sept.)! Extends to Eastern Sudan and East Africa. Exsicc.—*Se. Elliot* 5290. *Dawe* 434. *Deighton* 425; 1622; 2815. *Barter. Dalz.* 273.

3. HETERANTHERA Ruiz & Pav.—F.T.A. 8:2.

Aquatic herb; leaves long-petiolate, ovate, obtuse, deeply cordate at the base, 5–7 cm. long, 3–5 cm. broad, thin, glabrous, with numerous slender nerves ascending from the base; petiole sheathing at the base and embracing the capsule; flowers spicate, few; perianth-tube about 5 mm. long, lobes 6, oblong, about 4 mm. long, nervose; stamens 3 or reduced to 1 in the cleistogamous flowers. 1. *callifolia*
 Aquatic herb; leaves shortly petiolate, lanceolate, gradually acuminate, rounded at the base, about 6 cm. long and 1–1.3 cm. broad, thin and glabrous, with inconspicuous nerves; petiole sheathing at the base; flowers in short spikes, the basal one closed and concealed in the spathe within the leaf-sheath; open flowers with 3 stamens and gland-dotted perianth. 2. *Potamogeton*

1. *H. callifolia* Reichb.—F.T.A. 8:2; Chev. Bot. 659. *H. Kotschyana* Fenzl—F.T.A. 8:3. *H. pubescens*. A. Chev. Bot. 659. Flowers white; petioles hollow.
 French Sudan: Goa! Gourma! Koulikoro (Oct.)! Senegal! Ivory Coast: Baoulé Nord Circle!

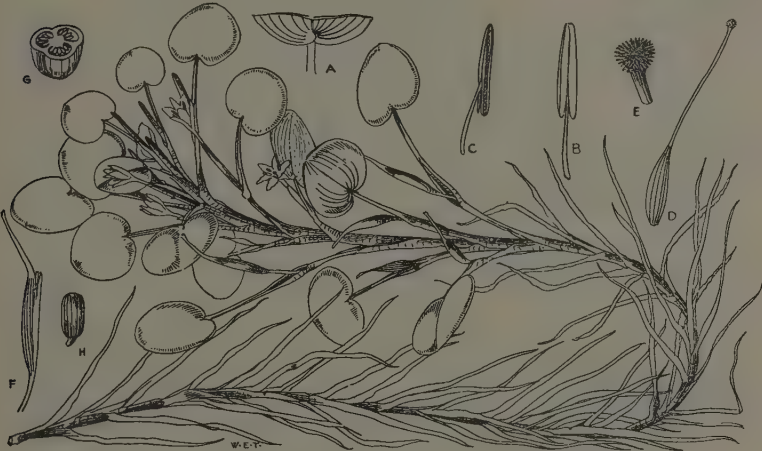


FIG. 303.—EICHORNIA NATANS Solms (PONTEDERIACEAE).

A, base of leaf. B and C, stamens. D, pistil. E, stigma. F, leaf-sheath. G, cross-section of ovary. H, seed.

Mankano Circle (July)! N. Nigeria: Katagum Distr.! South of Gombe (Oct.)! Extends to Eastern Sudan and the Northern Transvaal. Exsicc.—*Chev.* 2596; 21986; 22215; 24493. *Sieber. Heudelot* 230. *Dalz.* 227. *Lely* 687.

2. *H. Potamogeton* Solms—F.T.A. 8:3.
 Senegal: Pozo Cervalo! Exsicc.—*Perrotlet* 779.

167. SMILACACEAE

Shrubs, climbing or straggling, often with tendril-like petioles and prickly stems and branches; roots from an often stout rhizome; stems leafy. Leaves alternate or opposite, 3-nerved, reticulate-veiny between the nerves. Flowers dioecious or rarely hermaphrodite, small, arranged in axillary umbels, racemes or spikes. Perianth-segments 6, free or rarely united. Stamens 6; filaments free or united; anthers apparently 1-celled by the confluence of the cells, introrse. Ovary superior, 3-celled; ovules 1–2 in each cell, pendulous. Staminodes present in the female flower. Fruit a berry. Seeds 1–3; embryo small in hard endosperm.

Widely distributed.

SMILAX Linn.—F.T.A. 7: 424.

Flowers dioecious, in umbels or panicles; perianth-segments free; stamens 6 or more, free.

A climbing shrub with prickly shoots; leaves alternate, ovate-elliptic to broadly elliptic, abruptly and very shortly acuminate (acumen oblique in dried specimens), rounded to subacute at the base, averaging about 12 cm. long and 7 cm. broad, glabrous, prominently 3-nerved from the base, larger leaves widely subcordate; flowers dioecious; umbels axillary, shortly pedunculate, many-flowered; peduncle



FIG. 304.—*SMILAX KRAUSSIANA* Meism. (SMILACACEAE).

A, flowering shoot. B, male flower. C, stamen. D, female flower. E, fruits. F, fruit. G, seed.

bracteate at the base; pedicels slender, about 6 mm. long; perianth 5 mm. long; fruit subglobose, nearly 1 cm. diam. *Kraussiana*

S. Kraussiana Meism.—F.T.A. 7: 424: Chev. Bot. 643. *S. Kraussiana* vars. *Dregei*, *Morsumiana* and *Senegambiae* A.DC. A climber with yellowish green dioecious flowers.

Throughout the area (up to 4,000 ft. on Cameroon Mts.) and tropical Africa generally, and in Eastern Transvaal, Natal and Pondoland. (See Appendix).

168. ARACEAE

Herbs with watery, bitter or milky juice, with a tuberous or elongated rhizome, rarely woody and climbing. Leaves solitary or few, sometimes appearing after the flowers, if cauline then alternate and distichous or spirally arranged, entire or variously divided, often hastate or sagittate, with a membranous sheath at the base. Flowers small, arranged on a spadix enclosed in a spathe, hermaphrodite or unisexual, the males in the upper part, females below, rarely dioecious. Perianth present in the hermaphrodite flowers or absent from the unisexual flowers. Stamens hypogynous, 2–4–8, opposite the perianth-segments; anthers opening by pores or slits, free or united. Ovary superior or immersed, 1–many-celled; style various or absent. Ovules parietal, axile, basal or apical. Fruit a berry, or coriaceous and rupturing, 1–many-seeded. Seeds mostly with copious endosperm.

Temperate and tropical regions.

Terrestrial or epiphytic herbs or climbers; female flowers more than one:

Flowers hermaphrodite:

Herb with radical sagittate leaves 1. *Cyrtosperma*

Climber with cauline leaves cuneate at the base 2. *Raphidophora*

Flowers unisexual:

Perianth present; male flowers covering the upper part of the spadix 3. *Stylochiton*

Perianth absent :

Herbs without distinct stems :

Spadix without a terminal appendix :

Leaves not peltate :

Leaves sagittate, at most shallowly lobed 4. *Nepthytis*

Leaves much divided 5. *Anchomanes*

Leaves unequally 3-lobed to near the base 6. *Amauriella*

Leaves peltate, cordate at the base ; flowers and leaves produced in alternate seasons, the leaves accompanied by a peduncle bearing burr-like bulbils covered with hooked prickles 7. *Remusatia*

Spadix with a terminal appendix destitute of flowers ; rootstock tuberous :

Leaves and flowers produced together 8. *Colocasias*

Leaves and flowers produced at different times 9. *Amorphophallus*

Stems well developed and climbing or creeping and rooting at the nodes or erect :

Leaves neither pinnatisect nor perforated :

Ovary 1-2-celled ; ovule solitary ; anthers not connate :

Seeds with endosperm ; ovule basal ; leaves usually entire .. 10. *Culcasia*

Seeds without endosperm ; ovule inserted above the base of the cell ; leaves cordate, sagittate or hastate or 3-lobed 11. *Cercestis*

Ovary 2-3-celled ; ovules numerous in each cell ; anthers connate 12. *Anubias*

Leaves unequally pinnatisect or perforated 13. *Rhektophyllum*

Aquatic floating herbs, with a tuft of fibrous roots and a rosette of flabellately nerved leaves ; flowers unisexual, without a perianth, the female part of the spadix adnate to the spathe 14. *Pistia*

1. CYRTOSPERMA Griff.—F.T.A. 8 : 197.

Leaves sagittate, variable in size, up to about 45 cm. long, the basal lobes lanceolate, acuminate, forming a narrow sinus, the terminal lobe ovate-lanceolate, acute, glabrous, laxly reticulate ; petiole up to 2 m. long or more, prickly-toothed ; spathe long-pedunculate (overlapping the leaves), enveloping and much longer than the spadix, 20-35 cm. long, acuminate ; spadix sessile, cylindric ; flowers hermaphrodite ; berries 1.5 cm. long, oblong ; seeds covered with dentate crests .. *senegalense*

C. senegalense Engl.—F.T.A. 8:198 ; Bot. Mag. t. 7617 ; Chev. Bot. 679 ; Holl. 4:759. *Lasimorpha senegalensis* Schott—Schott Gen. Aroid. t. 85, figs. 1-10 and 11-20 (*L. Afzelii* Schott). From Senegal to S. Nigeria and Fernando Po ; also in the Congo. Exsicc.—Heudelot 639. Sc. Elliot 4333. Vogel 94. Deighton 1513. Johnson 874. Dulz. 863. Linder 779. Holland 64. Barter 1467. Mann 244. (See Appendix).

2. RAPHIDOPHORA Schott—F.T.A. 8 : 199. (*Afroraphidophora* Engl.)

A tall climber ; stem slender, rooting at the nodes ; leaves entire, oblong-oblancheolate, shortly cuneate at the base, gradually acuminate, 15-30 cm. long, 4-8 cm. broad, glabrous, with numerous pinnate parallel nerves spreading from the midrib at an angle of about 45° ; petiole up to 20 cm. long, sheathing ; peduncle 8-10 cm. long ; spathe closely wrapped around the spadix, beaked, 7-10 cm. long ; spadix sessile, up to 10 cm. long, 1.4 cm. diam. ; flowers hermaphrodite ; stigmas discoid *africana*

R. africana N.E.Br.—F.T.A. 8:200 ; Chev. Bot. 678. *R. ovoidea* A. Chev. Bot. l.c. *R. pusilla* A. Chev. Bot. 679, not of N.E.Br. *Afroraphidophora africana* Engl.—Engl. & Krause Pflanzenr. Araceae (vol. iv. 23B) 54. Climbing up to 100 ft. or so.

Sierra Leone : Kurusu (Apr.) ! Sakuru (Feb.) ! Liberia : Dukwia R. (Feb.) ! Ivory Coast : Bouroukrou (Dec.-Jan.) ! Malamalasso (Mar.) ! Grabo (July) ! Gold Coast : Assin-Yan-Coomassie ! S. Nigeria : Eket ! Fernando Po ! Also in French Cameroons and Uganda. Exsicc.—Sc. Elliot 4940 ; 5524. Cooper 284. Cummins 47. Talb. 3138. Mann 103. Chev. 16849 ; 17505 ; 19643 ; 19669.

3. STYLOCHITON Leprieur—F.T.A. 8 : 187.

Leaves closely rounded-cordate at the base :

Leaves more or less obovate, 12-16 cm. long, up to 12 cm. broad, with about 8 pairs of faint lateral nerves ; petiole up to 20 cm. long, sheathing at the base ; spadix accompanying the mature leaves, axillary, small ; spathe oblong-oblancheolate, abruptly acuminate, 5 cm. long, the margins shortly connate below into a tube ; peduncle 2.5 cm. long, slender 1. *Zenkeri*

Leaves ovate-elliptic, 6-10 cm. long, 4-5 cm. broad, with about 5 pairs of lateral nerves ; petiole 3-4 cm. long ; peduncle 2 cm. long ; spathe lanceolate, 2.5 cm. long 2. *hostifolius*

Leaves more or less hastate at the base :

Basal lobes of leaves very obtuse or rounded, more or less ovate and short, blade ovate-oblong, abruptly and shortly acuminate, 15-18 cm. long, 5-8 cm. broad, glabrous, with the nerves radiating mainly from the top of the puberulous petiole, latter sheathing in the lower half ; spathe 4.5 cm. long, tubular in the lower half ; spadix nearly equaling the spathe ; female flowers 5 in a whorl at the base, separated from the slender spike of male flowers 3. *Warneckei*

Basal lobes of leaves elongated and narrow, about 6 cm. long, blade narrowly lanceolate,



FIG. 305.—*STYLOCHITON WARNECKEI* Engl. (ARACEAE).
A, spathe and spadix. B, flower.

acute, about 15 cm. long; petiole about 20 cm. long, sheathing in the lowermost third; spathe 4 cm. long, contracted towards the base and tubular in the lower two-thirds, mucronate 4. *Barteri*
 Basal lobes of leaves linear-lanceolate, about 2.5 cm. long, blade triangular, acute, 7-8 cm. long; petiole 3 cm. long; spathe 2.5 cm. long, acuminate, tubular in the lower half; male portion of spadix partly exserted; filaments filiform

5. *hypogaeus*

1. *Stylochiton Zenkeri* Engl.—F.T.A. 8: 189. *S. gabonicus* N.E. Br.—F.T.A. 8: 190. Spathe light pink. Fernando Po! Extends to Gabon. Exsicc.—Barter 1470.
2. *S. hostifolius* Engl. Bot. Jahrb. 36: 238. Togo: Sokode-Basari, near Alédyo, 1,600 ft. (Feb.)! Exsicc.—Kersting 316.
3. *S. Warnecke* Engl. Bot. Jahrb. 36: 239. *S. Chevalieri* Engl. *S. Dalzielii* N.E. Br. Rhizome bright yellow; roots thick. French Sudan: Tiédiana (June)! Togo: Lome! N. Nigeria: Yola, very abundant in the north, Katagum, etc. (Apr.)! Abinsi (June-July)! Also in the Shari region. Exsicc.—Dalz. 237; 860. Chev. 994. Warnecke. (See Appendix).
4. *S. Barteri* N.E. Br.—F.T.A. 8: 194; Chev. Bot. 684. Herbaceous, about 18 in. high. Ivory Coast: Mankono! Dyolo country! S. Nigeria: Oyo, Yoruba! N. Nigeria: Nupe! Also in the Shari-Chad region. Exsicc.—Barter 1472; 3424. Note.—So far leaves and flowers have not been gathered together, and Barter's No. 1472 may not really belong to the flowering specimen represented by his No. 3424. (See Appendix).
5. *S. hypogaeus* Leprieux in Ann. Sci. Nat. Ser. 2, 2: 185, t. 5—F.T.A. 8: 192. *S. similis* N.E. Br.—F.T.A. 8: 194. Senegal: Cayor district, Oualo and Cape Verde! French Guinea: sandy alluvium at Farana, Niger River, 3,300 ft. (Mar.)! Exsicc.—Sc. Elliot 5373. (See Appendix).

4. *NEPHTHYTIS* Schott.—F.T.A. 8: 169; Engl. & Prantl Pflanzenf. 2, 3: 129, and Pflanzenr. Arac.-Lasioid. 110 (1911).

Leaves with a rather deep and distinct sinus between the upper and lower lobes, lobes ovate-elliptic, acutely long-acuminate, 15-20 cm. long, 5-10 cm. broad, glabrous; petiole slender; peduncle about half as long as the petiole, slender; spathe decurrent on the peduncle, oblong-lanceolate, acutely acuminate, 3-5 cm. long; spadix subsessile, 1.5-2 cm. long 1. *constricta*

Leaves without or with only a very shallow sinus between the upper and basal lobes: Spadix sessile or subsessile within the spathe, 4-5 cm. long; spathe oblong-elliptic, not acuminate, 5-6 cm. long, many-nerved; leaves broadly triangular in outline, lobes broadly acuminate, about 10-15 cm. long 2. *Afelii*
 Spadix stipitate; spathe abruptly acuminate, long-decurrent on the peduncle, finely spotted; leaves as in preceding but more narrowly acuminate . . . 3. *Poissonii*

1. *Nephtytis constricta* N.E. Br.—F.T.A. 8: 170; Engl. Pflanzenr. Arac.-Lasioid. 112, fig. 38, F-G. N. Talbotii Rendle. Herbaceous plant, 2 ft. high; spathe green. S. Nigeria: Rio del Rey! Oban! Fernando Po! Also in French Cameroons. Exsicc.—Johnston. Mann 106. Talb. 766.
2. N. Afzelii Schott.—F.T.A. 171; Engl. Pflanzenr. Arac.-Lasioid. 110, fig. 38, A-E; Chev. Bot. 683. Leaves 2-3 at the apex of the rhizome, erect, glabrous; spathe green, deflexed. Sierra Leone! Liberia! Monrovia! Ivory Coast: various localities! Exsicc.—Aefelius. Smeathman. Naumann. Hort. Bull.
3. N. Poissonii N.E. Br.—F.T.A. 8: 171; Engl. Pflanzenr. Arac.-Lasioid. 112, fig. 39. N. Gravenreuthii Engl. Leaves as above. S. Nigeria: Sonkwala (Jan.)! Oban! Barombi! Bibundi (Aug.-Nov.)! Extends to Gabon and the Congo. Exsicc.—Preuss 299. Talb. 767. Mildbr. 10639. Carpenter 758.

5. *ANCHOMANES* Schott.—F.T.A. 8: 161.

Male portion of spadix much longer than the female:

Ovary and fruit smooth; leaf solitary, with scattered short prickles on the petiole and rhachis; leaf-segments more or less oblong-lanceolate, gradually acuminate the upper ones mostly decurrent on the rhachis, very thin and glabrous; peduncle with scattered sharp prickles; spathe 20-30 cm. long or more; spadix shorter than the spathe, slender, the lowermost $\frac{1}{4}$ - $\frac{1}{2}$ with female flowers, the rest male; style distinct, deflexed 1. *difformis*

Ovary and fruit densely warted; other characters more or less as above . . . 2. *petiolatus*
 Male portion of spadix about equal to the female; spadix about $\frac{1}{4}$ as long as the spathe, lilac; spathe about 4 cm. long; leaves not known 3. *nigritianus*

1. *A. difformis* Engl. in DC. Monogr. Phan. 2: 304 (1879), partly; Engl. Pflanzenr. Arac. 4, 23c: 53, fig. 21; Chev. Bot. 679. *A. dubius* Schott.—F.T.A. 8: 163; Chev. Bot. 679. Holl. 755. *A. Dalzielii* N.E. Br.; Holl. 755. *A. obtusus* A. Chev. Bot. 679. Widely spread from Sierra Leone to Nigeria, extending to Angola and East Africa (E. Sudan to Tanganyika Territ.). (See Appendix).
2. *A. petiolatus* Hutch. in Kew Bull. 1936: ined. *Caladium petiolatum* Hook. *A. Hookeri* Schott.—F.T.A. 8: 162; Bot. Mag. t. 5394. *A. difformis* var. *Hookeri* Engl. l.c. 56. Herbaceous plant 6 ft. high; spathe purplish or brown-pink; peduncle often prickly. Fernando Po! Exsicc.—Mann 107. Ezell 841.
3. *A. nigritianus* Rendle Cat. Talb. Nig. Pl. 114 (1913). S. Nigeria: Oban, near Etara (Oct.)! Exsicc.—Talb. 1247.

6. *AMAURIELLA* Rendle in Cat. Talb. Niger Pl. 115, t. 16 (1913).

Lateral nerves very numerous and closely parallel; blade 3-partite nearly to the base, segments unequal, the two lateral narrowly lanceolate, the terminal elliptic to obovate,

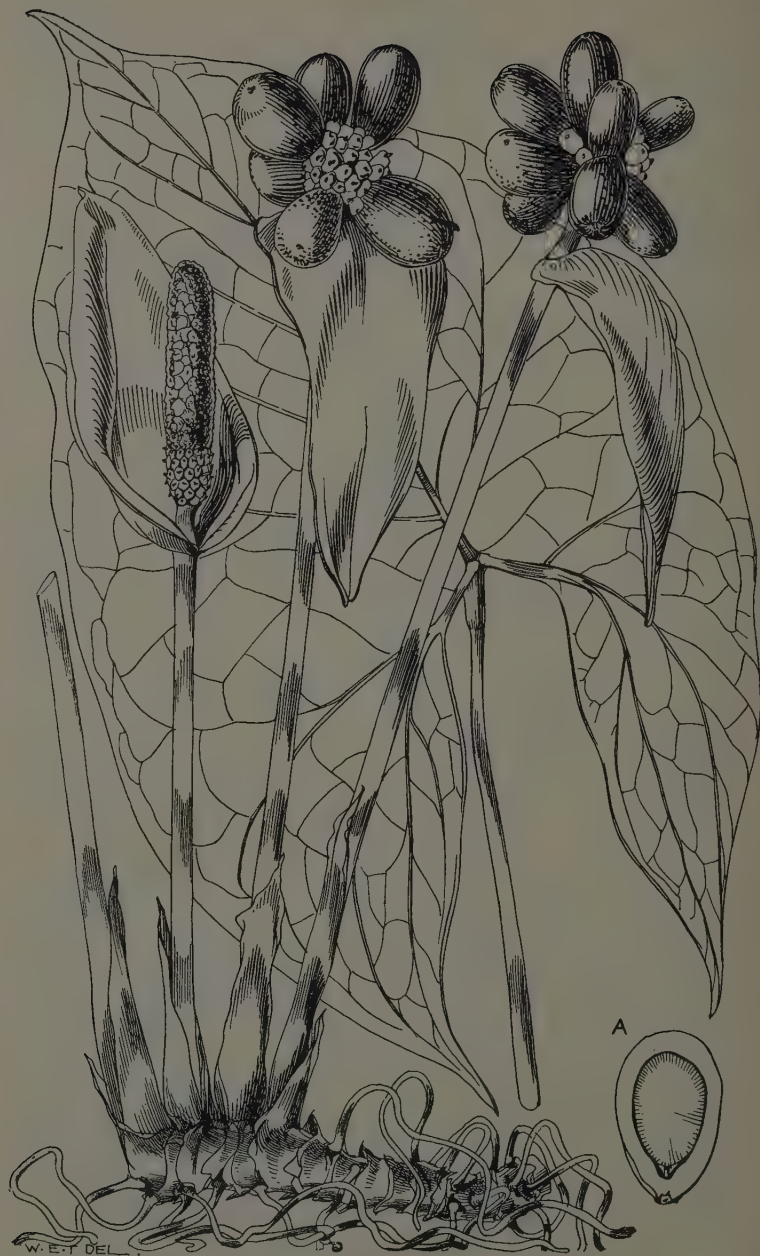


FIG. 306.—*NEPHTHYTIS AFZELII* Schott (ARACEAE).
A, vertical section of fruit.

elliptic, 15–20 cm. long, up to 10 cm. broad; peduncle slender, about 8 cm. long; spathe 2.5–3.5 cm. long; spadix as long as the spathe; female flowers in a subglobose cluster at the base of the spadix; males in a cylindric mass about 2 cm. long; anthers terminal on the filament; ovary 2-celled, with a thick disk-like stigma *obanensis*

A. obanensis Rendle l.c. *A. Talbotii* Rendle, sub t. 16, by error.
S. Nigeria: Oban! Exsicc.—*Talb.* 1297; 1532.

7. REMUSATIA Schott—Benth. & Hook. f. Gen. Pl. 3: 974.

A tuberous rooted herb, flowering and producing leaves in alternate years, the leaves accompanied by a peduncle bearing burr-like bulbils covered with hooked prickles; leaves ovate, peltate, cordate at the base, acutely acuminate, very variable in size, often tinged with purple below; spadix clothed with membranous leaf-sheaths, shortly pedunculate; spathe 8–10 cm. long, convolute around the female flowers, the male part of the short spadix exserted; ovary 1-celled, ovules numerous .. *vivipara*

R. vivipara Schott—Fl. Brit. Ind. 6: 521. *Ditinnia rupicola* A. Chev. Bot. 279 (under *Melastomaceae*) "Flowers" greenish-yellow.

French Guinea: Futa-Jallon; near Ditinn! Senegal: Iles de Los, near Konakry, coast south-east of Tamara, on laterite blocs (Oct.)! Also in French Cameroons and in the Eastern Tropics and Subtropics. Exsicc.—*Seraud* 11. Chev. 12839; 18500; 18531.

8. COLOCASIA Schott—F.T.A. 8: 164.

A herb; leaves peltate, more or less ovate, cordate at the base, basal lobes very obtuse, thin, glabrous; lateral nerves radiating from the base and pinnate, about 6–8 pairs; peduncle about 15 cm. long; spathe usually about 1.8 cm. long, narrow, acuminate, enfolding the spadix and articulating at the base of the male part in fruit; spadix much shorter than the spathe, tapered to the apex; berries enclosed in the persistent tube of the spathe *esculentum*

C. esculentum Schott Melet. 1: 18 (1832). *Arum esculentum* Linn. *A. colocasia* Linn. *Colocasia antiquorum* Schott—F.T.A. 8: 164; Bot. Mag. t. 7384; Hohl. 755. *Caladium esculentum* Vent.

Cultivated and often naturalised; native of Eastern Asia and Malaya. (See Appendix).

9. AMORPHOPHALLUS Blume—F.T.A. 8: 144. Engl. Pflanzenr. 4, 23c: Arac.-Lasioid. 61 (1911).

Spathe not forming a tube at the base:

Appendix of the spadix cylindric or tapered to the apex, long in proportion to the breadth:

Spadix shorter than the spathe:

Leaf-segments shortly cuspidate-acuminate, obovate, decurrent on the rhachis, 6–8 cm. long, 3.5–4 cm. broad, with about 6 pairs of looped lateral nerves; peduncle up to 30 cm. long; spathe ovate, folded at the base, 15–20 cm. long, wrinkled inside towards the base but without hairs; spadix about 10 cm. long, appendix 4–5 cm. long 1. *Barteri*

Leaf-segments gradually long-tailed-acuminate, oblanceolate, shortly decurrent on the rhachis, 15–17 cm. long, 4–5 cm. broad, with numerous looped lateral nerves; peduncle up to 50 cm. long, slender; spathe 12 cm. long, spadix a little shorter 2. *Preussii*

Spadix longer than the spathe:

Spathe without stiff hairs within the basal folded portion:

Spathe light green, about 8–15 cm. long, broadly elliptic; spadix half as long again to twice as long as the spathe, tapering to the top; leaf-segments oblong-oblanceolate, cuspidate-acuminate, decurrent on the rhachis, 10–12 cm. long, 3–4 cm. broad, with numerous parallel nerves looped within the margin; ovary finely verrucose 3. *flavovirens*

Spathe up to 8 cm. long:

Spadix slender and tapered, more than twice as long as the spathe, the latter acutely acuminate, 7–9 cm. long 4. *consimilis*

Spadix 5–6 cm. long, hardly twice as long as the spathe, the latter 5–6 cm. long, gradually acute; peduncle about 15 cm. long 5. *gracilior*

Spathe with numerous stiff hairs within the basal portion:

Spadix not more than twice as long as the spathe:

Spathe broadly ovate, narrowed to the apex, about 17 cm. long and 15 cm. broad when opened out; leaf-segments oblanceolate, tailed-acuminate, about 12 cm. long and 3 cm. broad, thin 6. *Johnsonii*

Spathe ovate-orbicular, about 12 cm. diam. when spread out, not pointed; spadix slender, 18 cm. long; leaves not known 7. *Staudtii*

Spathe suborbicular, about 25 cm. diam. when spread out, deeply crenate; leaf-segments broadly elliptic, broadly acuminate, the terminal about 25 cm. long and 10 cm. broad 8. *Mannii*

Spadix several times as long as the spathe:

Spadix narrowed above the female portion, very long; spathe broadly ovate when spread out, about 15 cm. long; male portion about 2 cm. long

9. *calabarius*

Spadix much thicker above the male and female portion :

Spathe at the base within clothed with filiform processes 10. *Zenkeri*

Spathe at the base within densely covered with stout hairs or soft bristles

11. *accensis*

Appendix of the spadix ovoid or ellipsoid, very short in comparison with its breadth :

Spathe open at the top, not much longer than the spadix, about 10 cm. long

12. *aphyllus*

Spathe hooded at the top, much longer than the spadix, 30–40 cm. long

13. *dracontoides*

Spathe forming a tube at the base, tube broadly campanulate, 4–5 cm. long; whole spathe up to 15 cm. long; spadix long-stipitate, much shorter than the spathe; flowering part 1.5 cm. long; appendix 3 cm. long; female flowers very few; leaves not known 14. *Elliotii*

1. *Amorphophallus Barteri* N.E.Br.—F.T.A. 8: 151. *A. Warneckei* Engl. & Gehrm. *A. gratus* N.E.Br. ? Root tuberous; spathe dark purple above, green below; spadix dark purple.

Togo: Lomé (Apr.)! N. Nigeria: Nupe! Katagum! Mamu, 2,500 ft. (May)! Abinsi! Exsicc.—*Warnecke* 103. *Poster* 21. *Dalz.* 237; 861. *Barto* 502; 1468. *Lely* 159. (See Appendix).

2. *A. Preussii* N.E.Br.—F.T.A. 8: 152; Engl. l.c. 95, fig. 34.

Cameroons Mt.: forest west of Buea, 3,000 ft. (Jan.–Mar.)! Exsicc.—*Preuss* 588.

3. *A. Baviroensis* N.E.Br.—F.T.A. 8: 153. *A. Baumannii* Engl.; Chev. Bot. 680. Spathe about 2 ft. high, whitish-green, with a few purple dots at the base inside.

French Sudan: Gourma! Gold Coast: Kwahu (Mar.)! near Aburi (Apr.)! Akim (May)! Togo: Misahöhe! Dahomey: Agouagon (May)! Atacora Mts.! Exsicc.—*Johnson* 25; 644; 873. *Irvine* 944. Chev. 23548; 24283. *Baummann* 204.

4. *A. consimilis Blume*—F.T.A. 8: 154; Engl. l.c. 93. *A. doryphorus* Ridley—F.T.A. 8: 152.

Cape Verde! Senegal: Cassamance! Gambia: St. Mary's Isl.! Sierra Leone: Juring (Feb.)! Exsicc.—*Leprieux*. Chev. 2801. *Maxwell*. *Lester*.

5. *A. gracilior Hutch.* in Kew Bull. 1936: ined. *A. gracilis* A. Chev. Bot. 653, name only, not of Engl. Leafless at flowering time; tuber flat on top.

Dahomey: Zagnanado Circle; Hollis country, near Abbo (Feb.)! Exsicc.—*Chev.* 22957.

6. *A. Johnsonii* N.E.Br.—F.T.A. 8: 156; Engl. l.c. 80. *A. purpureus* Engl. & Gehrm.; Chev. Bot. 681. *Hydrosme purpurea* Engl. Peduncle about 3 ft. high.

Senegal: between Bama and Bananakaldoro! Gold Coast: Kwahu, on rocks (Mar.)! Exsicc.—*Johnson* 643. Chev. 929. (See Appendix).

7. *A. Staudtii* N.E.Br.—F.T.A. 8: 154.

S. Nigeria: Johann Albrechtshöhe (Dec.)! Exsicc.—*Staudt* 767.

8. *A. Mannii* N.E.Br.—F.T.A. 8: 159; Engl. l.c. 100. *A. macrospadix* Font Quer in Cavanillesia 1: 79, with fig. Spathe dark purple.

Fernando Po! Exsicc.—*Mann* 652.

9. *A. calabarius* N.E.Br.—F.T.A. 8: 155. Peduncle 2–3 ft. high.

S. Nigeria: Calabar (Feb.)! Okun (Jan.)! Exsicc.—*Holland* 256. *Mann* 2336.

10. *A. Zenkeri* N.E.Br.—F.T.A. 8: 159.

S. Nigeria: Oban! Exsicc.—*Talb.* 1300.

11. *A. accensis* N.E.Br.—F.T.A. 8: 157; Chev. Bot. 679.

Ivory Coast: Upper Sassandra (May)! Gold Coast: near Accra! Exsicc.—*Hort. Sander*. Chev. 21515.

12. *A. aphyllus Hutch.* in Kew Bull. 1936: ined. *Arum aphyllum* Hook. in Gray Travels in West Afr. 386, t. A. *A. leonensis* Lem.—F.T.A. 8: 147, incl. vars.; Bot. Mag. t. 7768; Chev. Bot. 680.

French Sudan: various localities! Senegal: Cayor. French Guinea: various localities! Sierra Leone: Krufo (Feb.)! near Freetown! Exsicc.—*Azelius*. *Welwitsch* 219. *Bunting* 23. *Thomas* 493; 8697. Several varieties are cultivated. (See Appendix).

13. *A. dracontoides* N.E.Br.—F.T.A. 8: 148; Engl. l.c. 87, fig. 24, F–L; Chev. Bot. 680. Leaves 5 ft. high; tuber size of child's head, flattened; spathe about 1 ft. long, purple; fruit ellipsoid, $\frac{1}{2}$ in. long.

Gold Coast: Kpong, Volta River (Jan.)! Togo: Kpedsu, common after fires (Dec.)! Dahomey: Abomey! S. Nigeria: Ilaro! Abeokuta! N. Nigeria: Lokoja! Sokoto! Nupe! Bauchi Plateau! Exsicc.—*Johnson* 662. *Houze* 1030. *Millen*. *Dalz.* 564. *Barter* 1141. (See Appendix).

14. *A. Elliotii* Hook. f. in Bot. Mag. t. 7349—F.T.A. 8: 147. Peduncle about 9 in. long; leaf about $1\frac{1}{2}$ ft. diam.; spathe pinkish in the lower part, upper part green, mottled with brown.

Sierra Leone: in low grass near Wallia (Jan.)! Exsicc.—*Sc. Elliot* 4640.

Imperfectly known species.

A. *Fontanesii Kunth*—F.T.A. 8: 159.

Senegal (not seen). Described from a specimen cultivated in Paris.

10. CULCASIA Beauv.—F.T.A. 8: 173; Engl. Pflanzenz. 4, 23B: Arac.-Pothoid. 295 (1905).

Leaves cordate at the base, broadly lanceolate or oblong-lanceolate, gradually acuminate, or obtuse, 6–12 cm. long, 2–2.5 cm. broad, laxly reticulate below and with scattered linear immersed glands, glabrous, with 3–4 pairs of lateral nerves; petiole $\frac{1}{4}$ – $\frac{1}{2}$ as long as the leaf, sheathing nearly to the top; peduncles 2–3 together, short; spathe apiculate, about 1.5 cm. long 1. *parviflora*

Leaves not cordate at the base :

Stems erect, not climbing, with long stilt-like roots :

Leaves lanceolate, broadest about the middle or below, acutely acuminate, about 8 cm. long and 2.5–3 cm. broad; lateral nerves few; petiole about 2.5 cm. long, sheathing in the lower three-quarters; spathes not seen; fruit ellipsoid, nearly 1 cm. long 2. *gracilis*

Leaves oblanceolate to broadly elliptic :

Leaves oblanceolate, long-attenuated to the base, gradually acuminate, 15–16 cm.



FIG. 307.—*CULCASIA SCANDENS* P. Beauv. (ARACEAE).

A, spadix. B, male flower. C, section of same. D, female flower from above. E, vertical section of same. F, neuter flower from above. G, fruits.

- long, 4.5-7 cm. broad; lateral nerves rather numerous; petiole 4 cm. long; spathe 3.5 cm. long; fruit obovoid-ellipsoid 3. *striolata*
 Leaves broadly elliptic, not acuminate, about 18 cm. long and 11 cm. broad, with about 10 pairs of wavy lateral nerves ascending within the margin; petiole 6-7 cm. long; spathe 4 cm. long 4. *Mannii*

Stems climbing:

Spadix longer than the spathe:

- Leaves lanceolate, tapered to the acutely acuminate apex, cuneate at the base, about 10 cm. long and 2.5 cm. broad, with rather few ascending lateral nerves; petiole 1.5-2 cm. long, sheathing to the apex; spathe 2 cm. long, spadix a little longer 5. *lancifolia*

- Leaves elliptic or oblong-elliptic, abruptly acuminate, shortly and broadly cuneate at the base, 12-25 cm. long, 6-10 cm. broad, with several more prominent lateral nerves looped near the margin; spathe dorsally cuspidate near the apex, 4-5 cm. long, spadix a little longer 6. *scandens*

Spadix shorter than the spathe:

- Leaves lanceolate, gradually tapered to the apex; peduncles solitary; spathe 3 cm. long; leaf-blade about 12 cm. long and 4 cm. broad; petiole nearly as long as the leaf, narrowly sheathing 7. *insulana*

- Leaves elliptic or oblong-elliptic, more or less abruptly acuminate; peduncles several together:

- Leaves narrowed to the base, more than twice as long as broad, unequal-sided, 15-18 cm. long, 6-9 cm. broad, with numerous lateral nerves, about 8 pairs more conspicuous than the others; spathe about 4.5 cm. long, articulating at the base 8. *barombiensis*

- Leaves broadly rounded at the base, about twice as long as broad or less, about 30 cm. long and 15-18 cm. broad, with numerous lateral nerves, about 10 pairs more prominent than the others; petiole about half as long as the blade, broadly sheathing in the lower three-quarters of its length; spathe about 7 cm. long, articulating at the base 9. *angolensis*

1. *Culcasia parviflora* N.E.Br.—F.T.A. 8: 176; Engl. l.c. 299. *C. piperoides* A. Chev. Bot. 677, partly. Climbing to 15 ft. long; spathe green.
 Ivory Coast: Basin of the Sassandra; between Dago and Boutoubré (May)! Fernando Po (Dec.)! S. Nigeria! Extends through the Cameroons to the Belgian Congo. Exsicc.—Mann 105. Preuss 1333. Chev. 16334.
 Var. *obtusifolia* Engl. Leaves obtusely rounded at the apex. S. Nigeria: Victoria! Exsicc.—Preuss.
2. *C. gracilis* N.E.Br.—F.T.A. 8: 179; Engl. l.c. 297. Erect woody stems about 3 ft. high; berries red.
 Sierra Leone: wet banks of river at Dantilia (fr. Mar.)! Exsicc.—Sc. Elliot 5293.
3. *C. striolata* Engl.—F.T.A. 8: 179; Engl. l.c. 297; Chev. Bot. 678. *C. Engleriana* A. Chev. Bot. 677. Herbaceous plant about 1 ft. high, with stout ribbed pubescent stilt-like aerial roots.
 Ivory Coast: various localities! S. Nigeria: Ambas Bay (Feb.)! Between Victoria and Bimbia, in light forest! Exsicc.—Mann 781. Kalbreyer 86. Preuss 1161. Chev. 16378, etc.
4. *C. Mannii* Engl.—F.T.A. 8: 178; Bot. Mag. t. 5760 (*Aglaonema Mannii* Hook. f.). Stem erect, 1-1½ ft. high; spathe white, greenish outside; fruit scarlet.
 S. Nigeria: Victoria! Also in French Cameroons. Exsicc.—Mann (cult. spec. from Hort. Kew).
5. *C. lancifolia* N.E.Br.—F.T.A. 8: 175; Engl. l.c. 304.
 S. Nigeria: Lagos! Exsicc.—Moloney.
6. *C. scandens* P. Beauv. Fl. Ovar. 1: 4, t. 3.—F.T.A. 8: 174; Engl. l.c. 302; Chev. Bot. 679. *C. piperoides* A. Chev. in Journ. de Bot. 22: 133. *C. saxatilis* A. Chev. l.c.; Chev. Bot. 677. *C. tepoensis* A. Chev. *C. tenuifolia* Engl.? *C. liberica* N.E.Br. Climbing and epiphytic on trees; spathe pale green; spadix white or purplish; fruits red.
 Widely distributed from the Gambia to Nigeria, extending to Angola and in East Africa south to Lake Nyasa. (See Appendix).
7. *C. insulana* N.E.Br.—F.T.A. 8: 175; Engl. l.c. 301. *C. tubulifera* Engl. Creeping and epiphytic; spathe green.
 Fernando Po, 1,000 ft. (Dec.)! Cameroons Mt.: Buea, 3,000 ft. 4,000 ft. Exsicc.—Mann 325; 651. Lehmbach 159.
8. *C. barombiensis* N.E.Br.—F.T.A. 8: 177. *C. angolensis* var. *angustifolia* Engl.—Engl. l.c. 300.
 S. Nigeria: Barombi, on rocks! Also in French Cameroons. Exsicc.—Preuss 388.
9. *C. angolensis* Welw.—F.T.A. 8: 300; Engl. l.c. 300; Chev. Bot. 677. Climbing and epiphytic up to 100 ft. long; spathe green.
 French Guinea: various localities! Sierra Leone: Likuru, 3,000 ft. Liberia: Gbanga (Sept.)! Ivory Coast: various localities! Gold Coast: Aburi (Jan.)! Dahomey: Porto Novo (Jan.)! Fernando Po (Dec.)! Extends to the Congo and Angola. Exsicc.—Sc. Elliot 4950. Johnson. Mann 102. Linder 722.

11. CERCESTIS Schott—F.T.A. 8: 180; Engl. Pflanzenr. 4, 23c: Arac.-Lasiod. 114.

- Leaves 3-lobed or 3-partite; lateral nerves few and far apart; lobes oblong-elliptic, obtusely acuminate; peduncle about 4 cm. long; spathe shorter than the spadix, 5-6 cm. long, articulating and leaving a short cup at the base in fruit; fruit pentagonal

1. *Afzelii*

Leaves not lobed:

Leaves cordate or sagittate at the base:

- Basal auricles oblong, 4-5 cm. long, rounded at the ends; blade pandurate, acutely acuminate, 15-20 cm. long, with about 5 pairs of lateral nerves; peduncle 6 cm. long; spathe lanceolate, 5.5 cm. long, striate 2. *stigmaticus*

- Basal auricles broadly triangular but very obtuse-rounded at the apex, 4-5 cm. long; blade not pandurate, narrowly triangular, about 20 cm. long and 9 cm. broad

with 4-5 pairs of nerves; peduncle in fruit 2 cm. long; infructescence 5 cm. long; fruits nearly 1 cm. diam. 3. *sagittatus*
 Basal auricles very short and rounded; blade oblong-lanceolate, acutely acuminate, 15-20 cm. long, with 5-6 pairs of lateral nerves; peduncle 4 cm. long; spathe 5 cm. long, striate 4. *kamerunianus*

Leaves not cordate at the base:

Leaves oblong-lanceolate, acutely acuminate, about 20 cm. long and 6-7 cm. broad, thin, with about 8 pairs of lateral nerves; petiole 6-10 cm. long; peduncle 3 cm. long; fruit subglobose, 7-8 mm. diam. 5. *lanceolatus*

Leaves oblong-pandurate, truncate at the base, triangular-subacute, 20-25 cm. long, 6-8 cm. broad, papery, with 8-10 pairs of faint lateral nerves; petiole as long as the leaf or nearly so; peduncle 2 cm. long; spathe 8 cm. long, longer than the spadix 6. *ivorensis*

1. *Cercestis Afzelii* Schott—F.T.A. 8: 180; Engl. l.c. 118; Chev. Bot. 681. *C. scaber* A. Chev. Bot. 682, name only. Terrestrial and epiphytic; fruits red.

Senegal: Casamance! French Guinea: Santa and Timbo! Sierra Leone: Bagroo R. (Apr.)! Between Gboyama and Bendu (Apr.)! Farana, shady wet places in woods (Mar.)! Bendembu (Apr.)! Liberia! Ivory Coast: various localities! Gold Coast: Assin-Yan-Kumas! Kibbi Hills! S. Nigeria: Obani! Exsicc.—Mann 906. Garrett 2. Deighton 1601. Sc. Elliot 5319; 5683; 5792. Johnston 105. Whyte. Cummins 178. Johnson 258. Talb. 1261. Chev. 21180. Linder 453. (See Appendix).

2. *C. stigmaticus* N.E.Br.—F.T.A. 8: 181. *C. Elliotii* Engl. *C. Dinklagei* Engl. partly. *C. olepensis* and *C. hastifolia* A. Chev. Bot. 681, names only. An epiphyte; spathes green.

French Guinea: Guere's country (Mar.)! Sierra Leone: Duunia, Talla Hills (fr. Feb.)! Liberia: Monrovia (Jan.)! Ivory Coast: various localities! Fernando Po: 1,300 ft.! Exsicc.—Mann 324. Dinklage 2416. Chev. 17434, etc.

3. *C. sagittatus* Engl. Pflanzenreich Arac.-Lasioid. 116 (1911). A climber about 90 ft. high.

Liberia: Monrovia; Careyburg (fr. Feb.)! Exsicc.—Dinklage 2468.

4. *C. kamerunianus* N.E.Br.—F.T.A. 8: 182; Engl. l.c. 115, fig. 40. Scandent, rooting at the nodes. S. Nigeria: Barombi! Also in Gabon. Exsicc.—Preuss 147.

5. *C. lanceolatus* Engl. l.c.

S. Nigeria: Buea! Exsicc.—Reeder 1742.

6. *C. ivorensis* A. Chev. in Journ. de Bot. 1909: 135. On tree trunks.

Ivory Coast: Cavally Basin; Grabo (July)! Exsicc.—Chev. 19632; 19673.

12. ANUBIAS Schott—F.T.A. 8: 182.

Leaves not lobed:

Leaves 10 cm. or more long:

Leaves broadest below the middle, rounded, truncate or cordate at the base, rounded to acuminate at the apex, 15-25 cm. long, 5-10 cm. broad, glabrous except the puberulous midrib below, with numerous parallel lateral nerves spreading from the midrib at a wide angle; petiole slender, expanded and sheathing only towards the base; peduncle very slender; spathe oblong-lanceolate, shortly acuminate, 4-5 cm. long; spadix slender, about 5 cm. long, female flowers in the lowermost quarter, the remainder male 1. *Barteri*

Leaves broadest about the middle, more or less narrowed to the base:

Spathe 5-6 cm. long, shortly acuminate; leaves lanceolate to elongate-oblong-elliptic, mucronate at the apex, 15-25 cm. long, 3-10 cm. broad, with numerous parallel lateral nerves spreading from the midrib at an angle of 45°, with faint transverse tertiary nerves; spadix longer than the spathe 2. *Afzelii*

Spathe 3-4 cm. long, shortly cuspidate-acuminate; leaves lanceolate-elliptic, subobtusate at the apex, 12-15 cm. long, 3-5 cm. broad, with numerous lateral nerves spreading from the midrib at rather a sharp angle; spadix about as long as the spathe 3. *lanceolata*

Leaves about 5 cm. long, 2-2.5 cm. broad, ovate-elliptic, subacute, rounded at the base, lateral nerves faint; petiole about 2 cm. long; peduncle slightly overtopping the leaves, slender; spathe 2 cm. long, shortly pointed; spadix nearly as long as the spathe 4. *nana*

Leaves hastately lobed:

Leaves shallowly hastately trilobed, triangular in outline, about 12 cm. long and 10 cm. broad, lobes ovate-oblong, rounded at the apex, glabrous, with numerous lateral nerves; petiole about 25 cm. long, deeply grooved on one side; peduncles slender, 15 cm. long; spathe 2-5 cm. long, broadly elliptic, mucronate, spadix as long as the spathe, the upper three-quarters occupied by the male flowers 5. *gracilis*

Leaves deeply trilobed; middle lobe ovate-triangular, rounded at the apex, about 15 cm. long and 10 cm. broad, lateral lobes oblong-lanceolate, obtuse, 15-16 cm. long, up to 6 cm. broad, all glabrous and with numerous arcuate nerves; petiole tumid for about 2 cm. at the top; peduncle about 25 cm. long; spathe much folded, 7-8 cm. long; spadix a little longer than the spathe, the upper five-sixths covered with the male flowers 6. *gigantea*

1. *Anubias Barteri* Schott—F.T.A. 8: 185. Stems creeping on rocks, rooting at the nodes; spathe green. S. Nigeria: Ambas Bay (Feb.)! Fernando Po (Dec.)! Extends to Gabon. Exsicc.—Mann xv; 104. Barter 2045.

2. *A. Afzelii* Schott—F.T.A. 8: 183; Chev. Bot. 683. A herb in swamps or in water; leaves erect, the petiole pulvinate at the apex.

French Guinea: Futa Jallon! Sierra Leone: Bafodeya (Apr.)! Jigaya! Vatemba Road! Exsicc.—Sc. Elliot 5560. Thomas 2829. Barter. *Afzelius*.

3. *A. lanceolata* N.E.Br.—F.T.A. 8: 183. *A. minima* A. Chev. Mostly on rocks; stems short with crowded nodes; spathe white.
French Guinea: Guerze's country; Mt. Nzo (Mar.)! Ivory Coast: Cavally River Basin; Tepo country (Aug.)! Nuon River Basin! S. Nigeria: Ikure (Jan.)! Oban! Rio de Rey! Barombi (Aug.). Also in French Cameroons. Exsicc.—Holland 167. Talb. 768. Johnston. Preuss 422. Chev. 19746; 21001; 21114.
4. *A. nana* Engl. Bot. Jahrb. 26: 423.—F.T.A. 8: 186. A tiny herb with creeping stem; lateral nerves faint.
S. Nigeria: Victoria! Exsicc.—Lehmach.
5. *A. gracilis* A. Chev. Bot. 683, name only.
French Guinea: Konianke's country, Fassakoidou (Feb.)! Exsicc.—Chev. 20800.
6. *A. gigantea* A. Chev. Bot. 683, name only. *A. gigantea*, var. *tripartita* A. Chev.
French Guinea: Nionsomoridou, near Beyla, 1,800–2,100 ft. (Feb.)! Between Diédedou and Nionsomoridou (Feb.)! Ivory Coast: Upper Sassandra, between Farafina and Ouodé (May)! Between Sanrou and Ouodé (May)! Exsicc.—Chev. 20857; 20858; 21606; 21634.

13. RHEKTOPHYLLUM N.E.Br.—F.T.A. 8: 172; Engl. Pflanzenz. Arac. 4, 230: 119.

Climber; leaves large, unequally pinnatisect or perforated (the juvenile entire and hastate-triangular), lobes obliquely acuminate, glabrous; spathe about 10 cm. long, enfolding the slightly shorter slender spadix; stigma sessile, disk-like; fruiting spadix about 7 cm. long; fruits obovoid, about 1 cm. long, capped by the sessile discoid stigma *mirabile*

- R. mirabile** N.E.Br. in Journ. Bot. 1882: 195, t. 230; Engl. l.c. fig. 42. A climbing plant up to 30 ft.; spathe green; berries red.
Dahomey: Bokoutou, near Sakété! Fernando Po! S. Nigeria: Rio del Rey! Calabar! Extends to E. Sudan, Uganda and the Congo. Exsicc.—Mann 101. Barter. Monteiro. Chev. 22369. Carpenter 286.

14. PISTIA Linn.—F.T.A. 8: 140.

Leaves sessile in a rosette, oblong-spathulate, rounded, truncate or widely emarginate at the apex, up to about 12 cm. long and 5 cm. broad, with several subparallel flabellate nerves, softly puberulous to tomentellous on both surfaces, tomentose towards the base; spathe axillary, shortly pedunculate, up to 1.2 cm. long, tubular below, villous outside, ovate, with a broad white ciliolate margin; spadix shorter than the spathe, monoecious, the female part adnate to the spathe; male part a stipitate whorl of 3–8 flowers, each flower composed of 2 connate 2-celled anthers; ovary solitary, 1-celled, with a capitate stigma *Stratiotes*

- P. Stratiotes** Linn.—F.T.A. 8: 140; Holl. 754. A floating herb, propagated mainly by stolons; roots numerous, fibrous.

An aquatic, widely distributed throughout the tropics. (See Appendix).

169. LEMNACEAE

Small to minute floating or submerged herbs without roots or roots simple and thread-like. Flowers monoecious, nude or at first enclosed in a membranous sheath. Perianth absent. Male flowers: stamens 1–2; anthers 1–2-celled. Female flowers: ovary sessile, 1-celled; style and stigma simple; ovules 1–7. Seeds with fleshy or no endosperm; embryo straight, axile.

Temperate and tropical regions; in fresh water.

LEMNA Linn.—F.T.A. 8: 201.

Thallus-like shoots with several peltately attached roots, broadly elliptic to orbicular, usually 3 together, the largest about 7-nerved, about 3–7 mm. diam., the margins somewhat undulate; flowers on the margin of the thallus-like shoot, very small

Thallus-like shoots with a solitary root, oblong or elliptic, 3–4 mm. long; fruit ellipsoid, longitudinally ribbed.. .. . 1. *polyrhiza*
.. .. . 2. *paucicostata*

1. *L. polyrhiza* Linn.—F.T.A. 8: 201; Chev. Bot. 685; Holl. 759.
Dahomey: Zagnanado! S. Nigeria: Onitsha! Cosmopolitan distribution. Exsicc.—Barter 583. Chev. 23044.
2. *L. paucicostata* Hegelmaier—F.T.A. 8: 202; Chev. Bot. 685.
French Sudan: Djenné (July), etc.! Cosmopolitan distribution. Exsicc.—Chev. 1143. (See Appendix).

170. TYPHACEAE

Marsh or lake herbs with creeping rhizomes, often tall, with simple stems submerged at the base. Leaves mostly radical, elongated-linear, rather thick and spongy. Flowers unisexual, anemophilous, very numerous, densely crowded on a terminal spadix, the male and female similar, the male above, the female below, the two sexes contiguous or remote. Perianth of very slender jointed threads or elongated spatulate scales mixed with imperfect ovaries or stamens.



FIG. 308.—*TYPHA AUSTRALIS* Schum. & Thonn. (TYPHACEAE).

A, basal part of plant with most of leaves removed. B, spike. C, section of leaf. D, male flower. E, perianth-segment. F, stamen. G, female flower. H, staminode. I, vertical section of ovary.

Male flowers: stamens 2-5; anthers linear, basifixed. Female flowers: ovary 1-celled, stipitate. Fruit dry, at length splitting. Seed with a striate testa and mealy endosperm.

Temperate and tropical regions.

TYPHA Linn.—F.T.A. 8: 134. Characters of the family.

Aquatic herb up to 4 m. high; leaves elongate-linear, about 1 cm. broad, closely nerved, glabrous, with thin acute margins; flowers very numerous, in elongated cylindric spikes, the female in the lower half, the male in the upper half of the inflorescence and shortly separated or nearly contiguous; male flowers with filiform perianth-segments; anthers 2 mm. long; female flowers bracteolate *australis*

T. australis Schum. & Thonn.—F.T.A. 8: 135; Chev. Bot. 676. *T. angustifolia* A. Chev. Bot. 676, not of Linn. Central Sudan: Hoggar Mts., etc. Senegal: Dakar (Mar.)! French Sudan: Dere! Gold Coast: Quitta. Dahomey: Porto Novo! S. Nigeria: Kradu Lagoon! N. Nigeria: Sokoto to Bornu, very abundant in marshes! Extends to East and S. Africa. Exsicc.—Barter 3240. *Dals.* 519; 979. Chev. 42389. (See Appendix).

Note—Maire (Mém. Soc. Hist. Nat. Afr. Nord 3: 52 (1933)) records *T. elephantina* Roxb., an Indian species from the Hoggar Mts. I have not seen the specimen, which is probably *T. australis*.

171. AMARYLLIDACEAE

Herbs with a tunicated bulbous rootstock or rarely a rhizome. Leaves few from the base of the stem or bulb, linear, with parallel nerves and transverse secondary nerves. Flowers showy, solitary to many in an umbel at the top of the scape, subtended by an involucre of one or more usually membranous bracts. Perianth inserted below or usually above the ovary, petaloid; segments or lobes 6, free or united; corona often present. Stamens 6, opposite the segments, hypogynous or epigynous or on the tube; filaments free or expanded at the base and forming a "false" corona; anthers 2-celled, basifixed or versatile. Ovary superior or inferior, 3-celled, with usually axile placentas; style slender. Ovules mostly numerous. Fruit a capsule or berry. Seeds with fleshy endosperm and small embryo, sometimes winged.

Temperate and warm-temperature regions, rarer in the tropics.

Filaments free from each other to the base:

Flowers numerous and rather small, pedicellate; ovules 1-2 in each cell

1. **Haemanthus**

Flowers few and rather large, sessile or subsessile; ovules usually several or numerous in each cell 2. **Crinum**

Filaments united into a basal cup:

Ovules numerous in each cell of the ovary, in two series, spreading 3. **Pancratium**

Ovules 2 in each cell of the ovary, ascending from the base 4. **Hymenocallis**

1. HAEMANTHUS Linn.—F.T.A. 7: 386.

Stamens much shorter than the perianth-segments; perianth-tube very short (about 2.5 mm.); segments linear, 1.5 cm. long; bracts oblong-lanceolate, about as long as the flowers, membranous 1. *brachyandrus*

Stamens about as long or longer than the perianth-segments; perianth-tube about 1 cm. or more long:

Perianth-tube 2-2.2 cm. long, slender; segments broadly linear, 2 cm. long, 3-5-nerved; flowers numerous; bracts linear-lanceolate, about 3.5 cm. long; leaves oblong-elliptic, mucronate, narrowed at the base, about 20 cm. long and 8 cm. broad, with about 8 nerves on each side of the midrib, and distinct transverse veins

2. *longitubus*

Perianth-tube up to 1.5 cm. long:

Flowers up to about 30 in each umbel:

Perianth-segments narrowly linear-filiform, very little broader than the filaments; bracts linear-lanceolate, about 3 cm. long, membranous; pedicels slender, about 2 cm. long, with a callous thickening below the ovary; perianth-tube about 1.5 cm. long; leaves narrowly obovate-elliptic, about 15 cm. long and 6-7 cm. broad, with numerous close transverse veins 3. *rupestris*

Perianth-segments broadly linear, 3-6 mm. broad, much broader than the filaments; bracts linear-lanceolate, membranous, 3.5-5 cm. long; pedicels 1.5-2.5 cm. long; perianth-tube 0.8-1 cm. long; leaves oblong-oblancheolate to oblong-elliptic, shortly pointed, 10-25 cm. long, 6-9 cm. broad, with numerous parallel transverse nerves 4. *cinnabarinus*



FIG. 309.—*HAEMANTHUS RUPESTRIS* Baker (AMARYLLIDACEAE).

A, stamen. B, transverse section of ovary.

Flowers numerous (50 or more) in each umbel; perianth-tube about 1 cm. long; segments linear, broader than the filaments; bracts lanceolate, about 4 cm. long; pedicels slender, 3 cm. long; peduncle mottled; leaves obovate-elliptic, mucronate, gradually narrowed into the long petiole, about 16 cm. long and 7 cm. broad, with about 10 pairs of parallel lateral nerves and numerous faint parallel slightly oblique tertiary nerves 5. *multiflorus*

1. *Haemanthus brachyandrus* Baker—F.T.A. 7: 391.
Sierra Leone: in water near Kundita (Mar.)! Exsicc.—*Sc. Elliot* 5082.—A very imperfectly known species of which leaves have not so far been collected.
2. *H. longitubus* C. H. Wright in Journ. Linn. Soc. 37: 114. Very similar to and perhaps only a longer-flowered form of the next species.
Liberia: Sinoe Basin! Banga! Gold Coast: Dajon, near Axim (Apr.)! Exsicc.—*Johnston. Chipp* 170. *Linder* 1160.
3. *H. rupestris* Baker—F.T.A. 7: 388; *Holl.* 680. Flowering before the leaves, in rich damp soil; stems spotted with red, with callous thickening; flowers crimson-red.
Sierra Leone: common throughout! Liberia! N. Nigeria: Keana (Apr.)! Katcha (May)! Lokoja (Mar.)! Nupe! Vango Malabu, Yola Prov. (May)! Kontagora Prov. (June)! Bornu (May)! S. Nigeria: Bamenda (Jan.)! Exsicc.—*Deighton* 629. *Barter* 1505. *Lane-Poole* 12. *Johnston. Hepburn* 20. *Elliot* 58. *Shaw* 6. *Dalz.* 252; 567. *Vogel* 100. *Migeod* 319. *Thornewill* 168. (See Appendix).
4. *H. cinnabarinus* Decaisne in Flore des Serres t. 1195; F.T.A. 7: 390; *Holl.* 680. *H. Mannii* Baker—*Bot. Mag. t.* 6364. *H. rotularis* Baker; *Holl.* 680. *H. longipes* Engl. *H. Germanianus* J.Br. & K. Schum. *H. Kundianus* J.Br. & K. Sch. *H. multiflorus* A. Chev. *Bot.* 637, partly, not of Martyn. Stems red, with green blotches.
Sierra Leone: Bagroo R. (Apr.)! Liberia! Ivory Coast: various localities! Gold Coast: Ashanti! Asamankese! S. Nigeria: Obeyon (Jan.)! Oban! Lagos Colony! Yoruba! Rio del Rey! Johann Albrechtshöhe (Jan.)! Cameroons Mt., 4,000 ft.! Also in French Cameroons. Exsicc.—*Mann* 897; 1341. *Chipp* 586. *Holland* 253. *Talb.* 1295. *Moloney. Rowland. Schlechter* 13005. *Chev.* 16970, etc. *Preuss* 874. *Staudt* 514. (See Appendix).
5. *H. multiflorus* Martyn—F.T.A. 7: 388; *Bot. Mag. t.* 961 and 1995; *Andr. Bot. Rep. t.* 318; *Chev. Bot.* 637, partly; *Holl.* 680. A herb with an umbel of very many dark red flowers.
French Sudan! French Guinea: Los Islands! various localities! Sierra Leone: Falaba (Mar.)! Laminyia (Apr.)! Gold Coast: Odumase (Mar.)! N. Nigeria: Garrau Gabbas (May)! S. Nigeria: Awka! Common in shady plains throughout Yoruba! Ilaro (Jan.)! Also in East Africa from the Red Sea provinces south to Delagoa Bay. Exsicc.—*Kalbreyer* 230. *Sc. Elliot* 5462a; 5540. *Thomas* 115; 130. *Lloyd Williams* 110. *Elliot* 59. *Barter* 3423. *Millen* 113. *Millson* 65. *Chev.* 895; 985; 12176; 12857; 13451; 13618; 15751. (See Appendix).

2. CRINUM Linn.—F.T.A. 7: 393.

Leaves not submerged in water, erect or suberect:

Perianth-lobes very narrowly linear or narrowly oblanceolate:

Leaves linear, usually not more than 3 cm. broad:

Perianth-lobes two-thirds as long as the tube, the latter about 10 cm. long; leaves about 10 to a bulb, about 30 cm. long, less than 2.5 cm. broad; flowers 1–2 in each umbel; spathe-valves lanceolate, 5–8 cm. long; anthers 1.3 cm. long

1. *distichum*

Perianth-lobes less than half as long as the tube, the latter about 15 cm. long, slender; leaves rather numerous, about 35–40 cm. long, 2–3 cm. broad; flowers 4–5 in each umbel; spathe-valves linear-lanceolate, very thin, about 7 cm. long; anthers 1.5 cm. long 2. *purpurascens*

Leaves about 7 cm. broad, broadly elongate-oblanceolate, acuminate, up to 60 cm. long, with distinct oblique-transverse nerves; flowers about 6–8 in each umbel; spathe-valves lanceolate, 7–8 cm. long; perianth-tube 15 cm. long, lobes 9 cm. long; anthers 2 cm. long 3. *Lane-Poolei*

Perianth-lobes broadly lanceolate to almost obovate-lanceolate:

Leaves elongate-linear, with very close parallel nerves and usually without visible transverse nerves:

Leaf-margins undulate; blade 2.5–3.5 cm. broad, scabrid-serrulate on the margin; flowers about 5 in each umbel; spathe-valves narrowly lanceolate, 8–10 cm. long; perianth-tube about 15 cm. long, lobes 8–10 cm. long; anthers curved, 1.3 cm. long 4. *Sanderianum*

Leaf-margins straight:

Perianth-tube gradually expanded into the lobes:

Leaves very narrow, less than 2 cm. broad, smooth on the margin, up to 6 cm. long; flowers about 2 in each umbel; spathe-valves narrowly lanceolate, 8 cm. long; perianth-tube 10 cm. long, lobes about 10 cm. long; anthers 1.5 cm. long 5. *pauciflorum*

Leaves 3–4 cm. broad, slightly scabrid-serrulate on the margin; flowers 3–8 in each umbel; spathe-valves narrowly lanceolate, 10–12 cm. long; perianth-tube 7–8 cm. long, lobes 10 cm. long, long-acuminate; anthers 1.8 cm. long

6. *yuccaeiflorum*

Perianth-tube abruptly expanded into the lobes, 15–16 cm. long, slender; lobes broadly obovate, about 8 cm. long; anthers curved, 8 mm. long; spathe about 2 cm. broad, with smooth margins, tapered to the apex 7. *scillifolium*

Leaves broadly lanceolate, with spaced parallel and distinct transverse nerves, narrowed to the base, 5–9 cm. broad; flowers 3–6 in each umbel; spathe-valves narrowly triangular-lanceolate, 9–10 cm. long; perianth-tube 15–20 cm. long, lobes obovate, about 9 cm. long; anthers 1.3 cm. long 8. *giganteum*



FIG. 310.—*CRINUM NATANS* Baker (AMARYLLIDACEAE).

Leaves submerged and wavy, up to 100 cm. long and 3 cm. broad, elongate-linear, strongly bullate; flowers 3-5 in each umbel; spathe-valves narrowly triangular-lanceolate, about 8 cm. long; perianth-tube 15-17 cm. long, lobes oblanceolate, 8-9 cm. long 9. *natans*

1. *Crinum distichum* Herb.—F.T.A. 7: 400. *Amaryllis ornata* Gawl in Bot. Mag. t. 1253, as to figure only. A herb with distichous very narrow leaves; flowers 1-2 in each umbel, streaked with carmine. French Guinea: various loc. | Sierra Leone! Liberia! Exsicc.—*Azfelius* (not seen). *Elliot*. Chev. 13272; 13312; 13324; 20949. *Linder* 63.
- II. *C. purpurascens* Herb.—F.T.A. 7: 396; Bot. Mag. t. 6525; Holl. 681. Flowers white or pale-pink; anthers black or violet.
Gold Coast: Ancobra River (Dec.)! S. Nigeria: Bonny (Feb.)! Also in Gabon. Exsicc.—*Johnson* 867. *Kalbreyer* 57.
3. *C. Lane-Poolei* *Hutch.* in Kew Bull. 1936: ined. Flowers pure white, vanilla-scented, up to 18 in each umbel.
Sierra Leone: in gardens at Freetown! Exsicc.—*Lane-Poole* 368.
4. *C. bandlerianum* *Baker*—F.T.A. 7: 400; Chev. Bot. 636; Holl. 681. Leaves very narrow, with wavy margins.
French Guinea! French Sudan! Sierra Leone: Common in wet places from Badofeya to Farana (Mar.)! Exsicc.—*Sc. Elliot* 5155. *Hort. Sander.* Chev. 808, etc. (See Appendix).
5. *C. pauciflorum* *Baker*—F.T.A. 7: 399; Chev. Bot. 636; Holl. 681. Leaves very long and narrow; flowers white with purple stripes.
French Guinea! French Sudan! Ivory Coast! Gold Coast: Afram Plains (Mar.)! N. Nigeria: Yola, in marshes (Aug.)! Nupe! S. Nigeria: Jebba! Also in the Shari and Jurland, Eastern Sudan. Exsicc.—*Johnson* 641. *Dalz.* 251. *Barter* 1504. *Chev.* 931, etc.
6. *C. yuccaeiflorum* *Salisb.* Parad. t. 52; F.T.A. 7: 399; Chev. Bot. 637; Holl. 681. *C. glaucum* A. Chev. Flowers white with a line of purple down the middle of the perianth-lobes.
French Guinea: Kankan! Kouroussa! French Sudan: between Niamey and Gao! Togo: near Lome! Dahomey: near Savé (May)! N. Nigeria: Nupe, in grassy valleys! Nabardou, 2,300 ft. (May)! Abinsi! Bichikki, 2,200 ft. near Balfon, Bomi! S. Nigeria: Lagos! Extends to Gabon and Angola. Exsicc.—*Ryff.* *Warnecke* 305. *Chev.* 23581. *Barter* 1507. *Lely* 182. *Dalz.* 858. *Dawodu* 43. *Millen* 90. (See Appendix).
7. *C. scillofolium* A. Chev. in Bull. Soc. Bot. Fr. Mem. 211. Characterised by the very slender cylindric tube abruptly expanded into the limb.
Ivory Coast: Fort Binger and neighbourhood (July)! Exsicc.—*Chev.* 19499.
- II. *C. giganteum* *Anfr.* Bot. Rep. t. 169; F.T.A. 7: 404; Chev. Bot. 635; Holl. 681. *C. podophyllum* *Baker*—F.T.A. 7: 403; Chev. Bot. 636; Holl. 681. *C. suavelens* A. Chev. Flowers white, fragrant.
Distributed from French Guinea to Nigeria, Fernando Po (4,000-5,000 ft.) and south to Angola and Nyasa-land. Exsicc.—*Lane-Poole* 369. *Cummins* 158. *Goldie.* *Kalbreyer.* *Barter* 1500; 3264. *Ezell* 768. (See Appendix).
9. *C. natans* *Baker*—F.T.A. 7: 396; Bot. Mag. t. 7862; Chev. Bot. 636; Holl. 681. Leaves submerged in running water; flowers white, sweet-scented.
Sierra Leone: Franziga (Dec.)! Kwelu (June)! Gorongo (Dec.)! Bendugu (Apr.)! Liberia: near Kakatown! Ivory Coast: Bingerville (Feb.)! Prolo (Aug.)! Danané (Apr.)! Gold Coast: Prah tributary (Mar.)! Ancobra tributary (July)! S. Nigeria: Lagos (May)! Fernando Po! Also in Cameroons Exsicc.—*Sc. Elliot* 4782. *Lane-Poole* 122. *Dawe* 438. *Deighton* 289. *Fishlock* 86. *Vigne* 1273. *Millen* 174. *Mann* 1416. (See Appendix).

3. PANCRATIUM Linn.—F.T.A. 7: 406.

Bulb ovoid-globose, about 4-5 cm. diam., similar to the common onion; collar fairly long; leaves elongate-linear, subacute, weak and flaccid, 5-8 mm. broad, glabrous, with about 8 parallel nerves on each side of the midrib; flowers 1-5 in an umbel; outer spathe-bract narrowly lanceolate, 4-10 cm. long, membranous; perianth-tube slender, 12-15 cm. long, rather abruptly expanded into linear equal lobes about 7 cm. long, which are adnate in the lower part to the campanulate tube formed by the united expanded filaments; filaments wavy in their lower part; anthers 8 mm. long; stigma capitate *trianthum*

- P. trianthum** Herb.—F.T.A. 7: 407; Chev. Bot. 638. *P. Saharæ* Coss. Flowers fragrant, greenish-white or white with broad pink band up the outer lobes; filaments expanded into a large corona-like campanulate cup.
Mauritania! Central Sahara: Hoggar Mts.; various localities. French Sudan: Tinwana valley, Air (July)! Niolé (May)! various localities (see Chev.)! Senegal! French Guinea: Kouroussa (Dec.)! Sierra Leone: Sullmania (Mar.)! Falaiba! Gold Coast: Achimota (Dec.)! Togo: Lome! N. Nigeria: Zungeru and Lokola! Nupe! Yola (Apr.)! Katagum! S. Nigeria: Badagry (Jan.)! Tropical Africa and Subtropical S. Africa. Exsicc.—*Rodd.* *Chev.* 892. *Heudelot* 542. *Pobéguin* 610. *Sc. Elliot* 5213; 5287. *Irvine* 1008. *Warnecke* 93. *Barter* 1501. *Dalz.* 253. *Charles* in Herb. Chev. 25516; 28712. (See Appendix).

4. HYMENOCALLIS Salisb.—F.T.A. 7: 408.

Bulbous rootstock; leaves broadly linear, subacute, gradually narrowed to the base, up to 0.75 m. long and 5 cm. broad, with numerous parallel nerves; flowers several in an umbel on a flattened peduncle; spathe-bracts ovate-lanceolate or lanceolate, membranous; perianth with a long slender tube about 12-15 cm. long, gradually widened at the top into the 6 linear segments about 8-9 cm. long; filaments gliform, broadened out at the base and connate into a top-shaped corona-like tube about 3 cm. long; anthers 2-2.5 cm. long; fruit ovoid *littoralis*

- H. littoralis** *Salisb.* in Trans. Hort. Soc. 1: 338 (1812). *H. senegambica* Kunth & Bouché—F.T.A. 7: 408. A herb with white flowers, slender elongated perianth-tube and linear segments.
Sierra Leone: Liberia: Since Basin! S. Nigeria: Lagos! Also in Angola and Rhodesia and cult. in East and S. Africa; probably introduced from Tropical America. Exsicc.—*Johnston.* *Carter.* (See Appendix)



FIG. 311.—*PANCRATIUM TRIANTHUM* Herb. (AMARYLLIDACEAE).

A, stamen.

172. IRIDACEAE

Perennial herbs with underground rhizomes, corms or bulbs. Leaves often crowded at the base of the stem, mostly linear, flattened at the sides, sheathing at the base and equitant. Flowers hermaphrodite, actinomorphic, with a straight perianth-tube or the tube curved, or completely zygomorphic, usually ornamental and often mottled or spotted. Perianth petaloid, withering and persisting for some time; segments or lobes 6, 2-seriate, subequal and similar or different. Stamens 3, opposite the outer perianth-lobes; anthers 2-celled, opening by slits. Ovary inferior, 3-celled with axile, or 1-celled with parietal placentas; style 3-lobed, lobes sometimes petaloid. Ovules numerous. Capsule opening into the cells. Seeds with copious endosperm.

Generally distributed.

Style-branches petaloid; stamens opposite the style-branches; *Iris*-like flowers

- | | |
|--|------------------------|
| | 1. Morea |
| Style-branches not petaloid; stamens alternate with the style-branches: | |
| Spathes many-flowered; stems compressed or winged | 2. Aristea |
| Spathes 1-flowered; stems not compressed: | |
| Flowers solitary, not spicate; leaves filiform-setaceous | 3. Romulea |
| Flowers spicate or cymose; leaves flat: | |
| Perianth-tube elongated and slender, many times as long as the limb; segments subequal | 4. Acidanthera |
| Perianth-tube comparatively short: | |
| Style-branches bifid; flowers cymose | 5. Lapeyrousia |
| Style-branches or style entire: | |
| Perianth-segments subequal; seeds globose, not winged | 6. Hesperantha |
| Perianth-segments unequal; seeds usually winged: | |
| Perianth-limb oblique, not bilabiate | 7. Gladiolus |
| Perianth-limb bilabiate, the upper lobe hood-like, the 4 lower shorter and recurved | 8. Zygotritonia |

According to the Flora of Tropical Africa 7: 343, *Marica Sabini* Lindl. (= *M. caerulea* Lindl. = *Neomarica caerulea* Sprague) occurs in Fernando Po, where it was collected by Don. It was probably introduced from Tropical South America.

1. **MOREA** Linn. (*Moraea*)—F.T.A. 7: 338.

A herb about 1½ ft. high; leaves narrowly linear-oblancoleate, about 16 cm. long and 1 cm. broad, closely nerved, glabrous, rigid; stem-leaves bract-like, shortly overlapping each other and submembranous towards the apex; outer spathe-bract shorter than the inner, about 8 cm. long, closely nerved; ovary slightly exserted from the spathe, 2 cm. long; perianth 4-4.5 cm. long, mauve; capsule long-pedunculate, about 3.5 cm. long *zambesiaca*

M. zambesiaca Baker—F.T.A. 7: 339. A single-stemmed herb about 1½ ft. high, with 1-3 mauve flowers. N. Nigeria: Bauchi Plateau; Vom, 3,000-4,500 ft. Also in East Africa, Nyasaland, Port. E. Africa and Angola. Exsicc.—*Dent Young* 245.

2. **ARISTEA** Ker—F.T.A. 7: 346.

Clusters of flowers 1-2; stems compressed, narrowly winged; leaves linear, up to 20 cm. long, 5 mm. broad, closely nerved; outer subtending spathe-bract leafy, longer than the flower-clusters; floral bracts membranous; capsule 1.5 cm. long slightly reticulate, beaked by the spirally twisted persistent perianth 1. *Johnstoniana*

Clusters of flowers 7-10 in an elongated spike or panicle; stems compressed, very narrowly winged; leaves linear, up to 40 cm. long and 1 cm. broad, closely nerved; outer subtending bract much shorter than the floral cluster; floral bracts membranous:

Inflorescence unbranched:

Capsule elongate-oblong, 2 cm. long, valves with a deep groove in the middle

- | | |
|--|----------------------|
| | 2. Maitlandii |
| Capsule ellipsoid; axis of inflorescence very slender | 3. angolensis |
| Inflorescence branched; axis of inflorescence broad and almost winged; capsule oblong-ellipsoid, about 8 mm. long, shortly beaked, blackish when dry | 4. djalonis |

1. **A. Johnstoniana** Rendle—F.T.A. 7: 346. Herb 1-2 ft. with solitary or paired clusters of bright blue or purple flowers.

N. Nigeria: Bauchi Plateau; Vom! Between Bukuru and Hephram, 4,300 ft. Also in Abyssinia and East Africa. Exsicc.—*Dent Young* 240. *Lely* 342; P. 338.

2. **A. Maitlandii** Hutch. in Kew Bull. 1936: ined.

Cameroons Mt., in masses in boggy land above Buea (fr. July)! Exsicc.—*Maitland* 27.

3. **A. angolensis** Baker—F.T.A. 7: 347. A herb with ribbon-like stem and spikes of bright blue flowers.

N. Nigeria: Plain between Bukuru and Hephram, 4,300 ft. (July)! Also in Angola. Exsicc.—*Lely* 342.



FIG. 312.—*ACIDANTHERA AEQUINOCTIALIS* Baker (IRIDACEAE).
A and B, stamens. C, style-arms.

4. *A. djalonia* Hutch. in Kew Bull. 1936 : ined. *Anthericum djalonia* A. Chev. Bot. 648, name only. Erect 1½–2 ft. high; clusters of fruits sessile or pedunculate.
French Guinea: Futa-Jallon; Diaguissa, 4,000 ft. (fr. Apr. and Sept.–Oct.)! Exsicc.—Chev. 12652; 18859.

3. ROMULEA Maratti—F.T.A. 7 : 344.

Corm subglobose, about 2 cm. diam., with smooth scales; leaves filiform-setaceous, up to 30 cm. long, ribbed, glabrous; spathe-bracts 2, equal, lanceolate, closely nerved, 1.5 cm. long, acutely pointed; perianth 2 cm. long; fruit about 1 cm. long; seeds broadly obovoid-globose, flattened on two sides, nearly black, 2 mm. diam.

camerooniana

- R. camerooniana* Baker—F.T.A. 7 : 345. Perianth white with blue margins.
Camerouns Mt.: 7,000–10,000 ft. (Nov.)! Exsicc.—Mann 2135. Johnston 19. Maitland 845.

4. ACIDANTHERA Hochst.—F.T.A. 7 : 358.

Spathe-bract $\frac{1}{4}$ – $\frac{1}{2}$ as long as the perianth-tube, linear, 4–6 cm. long, reddish; corm finely reticulate, ovoid; leaves very long and rather weak, about 2 cm. broad; flowers few in a lax one-sided spike; nodes of inflorescence about 2.5–4 cm. apart; perianth white, the limb blotched with purple in the lower part; tube slender, about 12–14 cm. long, limb 4.5 cm. long; anthers exserted, 2 cm. long; capsule 2.5 cm. long 1. *aequinoctialis*
Spathe-bract about half as long as the perianth-tube, linear-lanceolate, 7–8 cm. long; leaves 1–1.5 cm. broad, with 3–5 prominent nerves; flowers about 5 in the spike; nodes 2–3 cm. apart; perianth white, with purple streaks; tube 12–13 cm. long, limb 4 cm. long; anthers exserted 2. *divina*

1. *A. aequinoctialis* Baker—F.T.A. 7 : 358; Bot. Mag. t. 7393.
Sierra Leone: bare rock near top of Sugarloaf Mt., 3,000 ft.! Gumah, 1,500 ft., in crevices of rocks (Nov.)! Konta-Bumban, bare granite, 1,000 ft.! Exsicc.—Don. Sc. Elliot 3954. Unwin & Smythe 4. Daise 571. Lane-Poole 81. Deighton 1244. (See Appendix).
2. *A. divina* Vaupel in Notizbl. Bot. Gart. Berl. 7 : 375.
Fernando Po: above Basile, north side of St. Isabel Peak, 7,000–8,500 ft. (Nov.). Exsicc.—Mildbr. 7175.

5. LAPEYROUSIA Pourr.—F.T.A. 7 : 350.

Stems flexuous, about 3-leaved, ribbed; leaves linear, very acute, up to 15 cm. long, 2 mm. broad, 3-nerved, glabrous; cymes few-flowered, dichotomously branched; spathe-bracts ovate-elliptic, 5 mm. long; perianth about 2.3 cm. long, lobed to the middle; capsule globose, shorter than the bracts *montana*

- L. montana* Hutch. in Kew Bull. 1921 : 403. A herb about 1 ft. high on rocks, with lax cymes of blue flowers; 3 perianth lobes with a dark purple spot at the base.
N. Nigeria: Top of Zaranda Mt., 5,800 ft. (May)! Two miles east of Gov. Station, Naraguta (June) Vom! Liruwen-Kano Hills! Exsicc.—Lely 189; 271; P. 259. Dent Young 244. Carpenter.

6. HESPERANTHA Ker—F.T.A. 7 : 348.

Corm very small, subglobose; leaves few, cauline, narrowly linear, flat, up to 17 cm. long, 1-nerved, grass-like; inflorescence about 3-flowered; outer spathe-bract broadly lanceolate, 1.5–2 cm. long, several-nerved, shortly tubular at the base; perianth 2–2.5 cm. long, segments as long as the tube; capsule 1.5 cm. long, valves 3-nerved; seeds globose, 1.5 mm. diam. *alpina*

- H. alpina* Benth. & Hook. f.—F.T.A. 7 : 348. Perianth pink.
Camerouns Mt.: 8,000–10,000 ft.! Exsicc.—Mann 2134. Johnston 18.

7. GLADIOLUS Linn.—F.T.A. 7 : 360 (incl. *Hebea*).

Flowering stems with well-developed leaves:

- Perianth 6 cm. long or more; flowers not purple, few, usually loosely arranged:
Flowers primrose-yellow, hooded; bracts lanceolate, acute, about 6 cm. long; anthers nearly 2 cm. long; leaves 1–1.5 cm. broad, up to about 45 cm. long; capsule 2.5 cm. long, faintly transversely nerved 1. *primulinus*
Flowers yellowish-green or apricot and mottled with brown or carmine, hooded; leaves broader than in preceding species, up to 4 cm. broad 2. *Quartinianus*
Flowers pink; perianth-lobes pointed, subequal and not hooded; bracts about 4 cm. long, faintly nerved; leaves flaccid and grass-like, at most 5 mm. broad; capsule 2 cm. long, faintly veined 3. *oligophlebius*
Perianth up to 4 cm. long; flowers purple, more or less crowded on the spike:
Leaves over 1 cm. broad; flowers rather numerous; bracts 3 cm. long, closely nerved 4. *Klattiaus*
Leaves under 1 cm. broad, rigid; flowers rather few; bracts 3–4 cm. long, closely nerved 5. *pseudogregarius*

Flowering stems with short scale-like leaves or very short leaves:

- Bract about as long as the perianth-tube, 1.5 cm. long; flowers mauve-pink or white, usually numerous on the spike; leaves very short and closely adpressed to the



FIG. 313.—*GLADIOLUS QUARTINIANUS* A. Rich. (IRIDACEAE).

A and B, stamens. C, style-arms.



FIG. 314.—*GLADIOLUS KLATTIANUS* Hutch. (IRIDACEAE).

A and B, stamens. C, style-arms. D, fruit.

stem; perianth about 3 cm. long; anthers 7 mm. long; capsule 2 cm. long, closely mottled with carmine, not nerved transversely 6. *unguiculatus*
 Bract much longer than the perianth-tube, acutely acuminate, about 3 cm. long; flowers pink, few; leaves closely adpressed to the stem, very acute; perianth 4 cm. long; capsule 1.5 cm. long, strongly transversely nerved 7. *Melleri*

1. *Gladiolus primulinus* Baker in Gard. Chron. 1890: 122. A herb 4 ft. in grass, with pure primrose-yellow flowers; perhaps a colour form of the next species.

French Guinea: Botola, 1,500 ft. (July)! Sierra Leone: South Koinadugu distr. ! N. Nigeria: Naraquta, 4,000 ft. (May)! Nabardo (Sept.)! Liruwen-Kano Hills! Also in East Africa and Rhodesia (Victoria Falls). Exsicc.—*Colletette* 79. *Burbridge* 506. *Lely* 244; 625. (See Appendix).

2. *G. Quartianianus* A. Rich.—F.T.A. 7: 371 (excl. syn. *G. primulinus* Baker); *Holl.* 679. *G. Buettneri* Pax; *Chev. Bot.* 633. *G. occidentalis* A. Chev. Bot. 634, name only. A herb 3-4 ft. with large mottled apricot flowers.

Extends from French Guinea to N. Nigeria, and in East and South Tropical Africa. Exsicc.—*Pobéguin. Colletette* 53; 76. *Chev.* 21468; 21655; 21664; 21725; 21857; 24488. *Chipp* 736. *Howes* 927. *Johnson* 773. *Buettner* 8. *Lely* 256. *Dalziel* 250; 846. (See Appendix).

3. *G. oligophlebius* Baker—F.T.A. 7: 367. *G. caudata* Baker. A slender grass-like herb in rock-crevices, with rather large pink flowers.

French Sudan: Kong country, Upper Volta! N. Nigeria: Mada Hills, 2,500 ft. (Aug.)! Also in Cameroons, S. Tanganyika, N. Nyasaland and N. Rhodesia. Exsicc.—*Hepburn* 76. *Bouet in Herb. Chev.* 2559.

4. *G. Klattianus* Hutch. in Kew Bull. 1936: ined. *G. spicatus* Klatt, not of Linn; *Holl.* 680. *G. multiflorus* *Holl.* 679, not of Baker—F.T.A. 7: 369. A herb 2½ ft. in grass with purple flowers with a dark spot on the lower segments.

French Guinea: Koulikoro! Beyla, 1,300 ft. (July)! Sierra Leone: without loc. ! N. Nigeria: Jeba! Zungeru (Sept.)! Lokoja! Also in Angola. Exsicc.—*Colletette* 81. *Barter. Dalziel* 252; 253. *Yates* 31; 82. *Parsons. Elliott* 193. *Glanville* 360. *Chev.* 2561. (See Appendix).

5. *G. pseudogregarius* Mildbr. ex Hutch. in Kew Bull. 1936: ined. A slender herb with very narrow leaves and a short spike of purple flowers.

Gold Coast: without loc. ! N. Nigeria: Bauchi Plateau (June)! Between Hephham and Ropp, 4,600 ft. (July)! Also in Cameroons. Exsicc.—*Lely* 357; P. 389. *Dent Young* 242. *Lloyd Williams* 554.

6. *G. unguiculatus* Baker—F.T.A. 7: 372. *Antholyza Fleuryi*, A. djalensis and A. sudanica A. Chev. Bot. 634. A. labiata Pax. A slender herb, the flowering stems with very short leaves and mauve-pink or white flowers.

From French Sudan and French Guinea (N'zo Mt., 5,000 ft.) to the Bauchi Plateau and through the Shari to the Eastern Sudan and East Africa, and through the Congo to Angola. Exsicc.—*Chev.* 977; 13413 ter; 13590 bis; 21024; 24001; 24043. *Morsion. Scotland in Herb. Deighton* 713. *Johnson* 1071. *Vigne* 1699. *Lely* 97. *Dalziel* 448; 845. *Kilsen. Kling* 209. (See Appendix).—For full synonymy see Mildbr. in Engl. Bot. Jahrb. 58: 232.

7. *G. Melleri* Baker—F.T.A. 7: 362. A herb on plains and among rocks, with almost leafless stem and pale pink flowers.

N. Nigeria: Bauchi Plateau (May)! Zaranda Mt., 5,800 ft. (July)! Also in Portuguese East Africa and Nyasaland. Exsicc.—*Lely* 190; P. 284.

8. ZYGOTRITONIA Mildbr. in Engl. Bot. Jahrb. 58: 230 (1923).

Leaves very narrow, at most 5 mm. broad, about 15 cm. long, those on the stem gradually smaller, acute; flowers in simple or branched spikes much longer than the basal leaves; perianth very zygomorphic, about 1.5 cm. long, the upper lobe very narrow and hood-like over the style and stamens, the remainder shorter and recurved; capsule 3-lobed, about 5 mm. long, slightly reticulate 1. *praecox*

Leaves about 2 cm. broad, up to 30 cm. long, mostly about 2 towards the base of the stem, acute; flowers in a simple or 3-branched panicle, very similar to the above, but a little larger; capsule warted 2. *crocea*

1. *Z. praecox* Stapf in Hook. Ic. Pl. sub t. 3120. Corm about 1 in. diam., covered with reticulate-fibrous tunics; flowers white; capsule slightly pustulate.

French Guinea: Kouroussa! Dabola! Labé! N. Nigeria: Abinsi, alluvial soil amongst grasses (June-July)! S. Nigeria: Udi Highlands (Apr.)! Exsicc.—*Dalziel* 847. *Kilsen. Pobéguin* 367; 1124.

2. *Z. crocea* Stapf l.c.

French Guinea: Bissikrima! Kouroussa! Dahomey: Atacora Mts., 1,600 ft. (June)! N. Nigeria: near Zungeru (June)! Katsina Allah, on stony hills (June)! Exsicc.—*Dalziel* 558; 848. *Pobéguin* 391; 1123 partly. *Brossart in Herb. Chev.* 11639. *Chev.* 23964. (See Appendix).

173. DIOSCOREACEAE

Usually climbers with tuberous rhizome or thick woody rootstock. Leaves alternate or rarely opposite, often cordate and digitately nerved, entire or divided. Flowers small, spicate, racemose or paniculate, unisexual. Perianth campanulate or spreading, 6-lobed, lobes 2-seriate. Stamens 6 or 3 reduced to staminodes, or 3 without staminodes; filaments free or shortly connate; anthers 2-celled. Rudimentary ovary present or absent. Staminodes often present in the female. Ovary inferior, 3-celled; style 3, free or connate. Ovules 2 in each cell, superposed on axile placentas. Fruit a 3-valved capsule or a berry. Seeds often winged, with endosperm.

Tropics and warm temperate regions.

DIOSCOREA Linn.—F.T.A. 7: 414; Knuth in Engl. Pflanzenz. Dioscoreac. 45 (1924).

Fruit a 3-winged capsule; seeds winged; rootstock tuberous; leaves simple or digitately compound.

Leaves simple :

Indumentum on the lower surface of the leaves stellate ; leaves ovate-orbicular, widely cordate at the base, very sharply acuminate, about 6 cm. long and nearly as broad, minutely stellate-puberulous but at length glabrescent above, softly and shortly stellate-pubescent below ; male racemes axillary, fasciculate, slender, stellate-pubescent all over 1. *hirtiflora*

Indumentum on the lower surface of the leaves not stellate, or absent :

Leaves villous-tomentose below, broadly ovate, widely cordate at the base, obliquely long-tailed-acuminate, 7-12 cm. long and a little less broad, glabrous or nearly so above, with about 9 main nerves and numerous slender transverse nerves ; male inflorescences axillary, fasciculate, slender, pubescent ; flowers distinctly pedicellate ; bracts subulate ; female inflorescence solitary ; fruits oblong, 5 cm. long, 3 cm. broad, narrowly winged, at first thinly pilose, soon glabrous ; seeds nearly 4 cm. long, with a prominent wing at each end 2. *Preussii*

Leaves glabrous or very nearly so below :

Leaves more or less irregularly lobulate, large, up to 30 cm. diam., suborbicular in outline, deeply cordate at the base, very abruptly acuminate, acumen 3-6 cm. long ; petiole about as long as the blade ; male inflorescences paired, axillary, slender, about 30 cm. long, glabrous ; flowers paired ; perianth glabrous 3. *macroura*

Leaves not lobulate :

Stems 4-winged :

Leaves opposite, broadly ovate, deeply cordate, long-tailed-acuminate, up to 30 cm. long and 20 cm. broad, 7-nerved at the base, glabrous ; male flowers in axillary panicles, the spikes fasciculate on the axis, very zigzag and short ; female spikes simple, solitary, axillary, glabrous ; fruit transversely elliptic, emarginate, about 2.5 cm. long and 3.5 cm. broad ; seeds suborbicular, winged all round 4. *alata*

Leaves as above ; inflorescence tomentose 5. *colocasiifolia*

Stems not winged :

Leaves alternate, broadly ovate, widely cordate, acutely acuminate, up to 20 cm. long and broad ; fruits longer than broad, oblong-elliptic, 2.5 cm. long, nearly 1.5 cm. broad ; male spikes slender, in axillary fascicles, sometimes up to 20 cm. long ; female spikes usually paired 6. *bulbifera*

Leaves opposite ; fruits broader than long :

Male inflorescences fasciculate, 3 or more together, slender :

Leaves 5-nerved :

Leaves ovate, widely cordate at the base, acutely and gradually acuminate, averaging about 10 cm. long and 5-6 cm. broad, thin ; male spikes usually axillary 7. *praeensis*

Leaves suborbicular, rounded or slightly cordate, abruptly and shortly acuminate, 6-10 cm. diam., coriaceous ; fascicles of male spikes in long leafless panicles 8. *minutiflora*

Leaves 3-nerved, broadly elliptic or ovate-oblong, shortly acuminate, rounded or broadly rounded-cuneate at the base, averaging about 10 cm. long and 5-6 cm. broad, firm ; male spikes in long leafless panicles ; fruits transversely oblong-elliptic, 4 cm. broad ; seeds winged all around, about 2.5 cm. diam. 9. *smilacifolia*

Male inflorescences solitary or in pairs :

Tuber with white flesh ; resting season long 10. *rotundata*

Tuber with yellow flesh ; resting season shorter 11. *cayenensis*

Leaves compound :

Leaves trifoliolate ; leaflets broadly and obliquely ovate, the terminal one often broader and more obovate, entire or the lateral sometimes bilobed, sharply acuminate, averaging about 12-15 cm. long and 6-9 cm. broad, setulose-pubescent above, softly tomentose below ; petiole pubescent and often prickly ; male flowers in congested axillary softly pubescent panicles ; female flowers in slender simple axillary spikes, softly tomentose all over ; fruit oblong, 4 cm. long, 2 cm. broad, shortly pubescent ; seed with a broad wing at one end 12. *dumetorum*

Leaves 3-5-foliolate ; leaflets more or less elliptic, triangular-subulate-acuminate, about 4-6 cm. long and 2-3 cm. broad, minutely and sparsely pubescent above, shortly and sparsely pubescent below or glabrescent, punctate ; petiole rather short, not prickly ; male flowers in clusters of very short axillary tomentose spikes ; female flowers in short solitary or paired pedunculate spikes ; bracts glabrous except at the base ; fruits oblong-elliptic, 2.5 cm. long, 1.5 cm. broad ; seeds with a broad wing at one end 13. *Quartiniiana*

1. *Dioscorea hirtiflora* Benth.—F.T.A. 7: 416 ; Knuth in Engl. Pflanzenr. Dioscoreac. 307, fig. 57 ; Chev. Bot. 640, partly. *D. rubiginosa* Benth. *D. sativa* var. *sylvestris* A. Chev. Bot. 642, partly. *D. polyantha* Rendle Cat. Tab. Nig. Pl. 112, not of Rendle in Welw. Cat. 37. *D. Dusenii* Uline. A climber with aerial tubers and white or cream flowers ; leaves covered with stellate hairs below.

French Guinea : Futa-Jallon ! Kouria ! Sierra Leone : various localities ! Liberia : Peáhtah ! N.

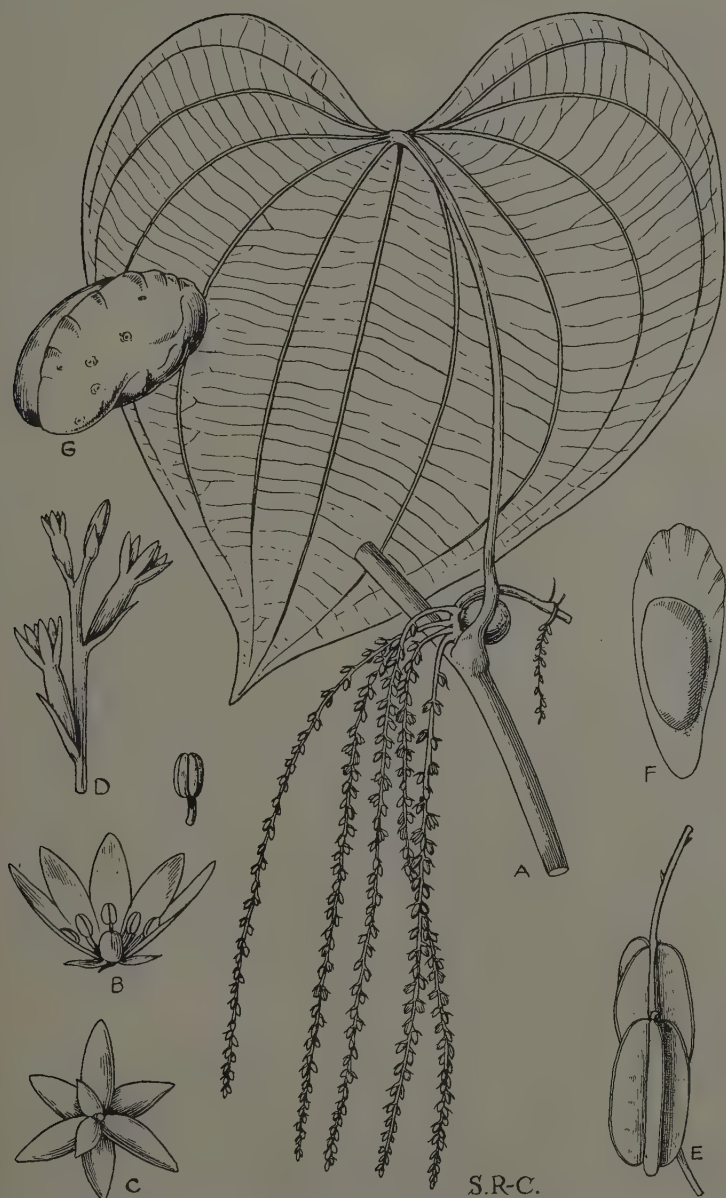


FIG. 315.—*DIOSCOREA BULBIFERA* Linn. (DIOSCOREACEAE).

A, male inflorescence and leaf. B, male flower with one perianth-segment removed.
C, male flower from below. D, female flowers. E, fruits. F, seed. G, bulbil.

- Nigeria: Lokoja! Nupe! Bauchi! S. Nigeria: Lagos! Oban! Exsicc.—*Chev.* 18269; 18334; 18649. *Caille* in *Herb. Chev.* 14979. *Thomas* 1735; 2164; 2275; 2601; 2993; 3291; 3952; 3963; 4043; 4147; 4489; 4680; 4704; 4766; 4913. *Morson*. *Deighton* 1339; 1347; 1411; 1423; 1425; 1427; 2161. *Vogel* 199. *Millen* 29. *Dawodu* 211. *Talb.* 722; 724; 781. *Farquharson* 5. *Barter* 561. *Dent* Young 248. *Winkler* 216. *Dusen* 404. *Linder* 493; 1037. (See Appendix).
2. **D. Preussii** Pax—F.T.A. 7: 417; Knuth l.c. 221. *D. Chevakeri* De Wild. *D. hirtiflora* A. Chev. Bot. 640, partly, not of Benth. *D. Schimperiana* var. *vestita* Baker F.T.A. 7: 419, partly. A climber with leaves tomentose below, and white flowers.
- Sierra Leone: Binkolo! Bumbana! Kasokora! Masumubi! Ivory Coast: Toura country! Mankono! S. Nigeria: Abeokuta! Oban! Aguku distr.! Victoria! Between Barombi and Kumba! Cameroons Mt.: Mimbia Village, 3,000 ft. (Feb.)! Extends to the Eastern Sudan and the Belgian Congo. Exsicc.—*Thomas* 1678; 1699; 1718; 1760; 3202. *Deighton* 1243. *Glennville* 1424. *Irvine* 103. *Millen* 17. *Talb.* 780. *Farquharson* 1. *Thomas* 975; 1020; 1748. *Maitland* 68; 314; 1311. *Preuss* 504. *Chev.* 13962; 13979; 21612; 21956. (See Appendix).
3. **D. macroura** Harms—F.T.A. 7: 416; Knuth l.c. 87, fig. 19, A-E; De Wild. in *Ann. Mus. Cong. Bot.* 5, Ser. 2: t. 28. *D. Welwitschii* Rendle. A climber with large lobulate leaves and axillary purple bulbils; nerves markedly looped to the apex.
- Togo. Dahomey: Dassa country! Mt. Savalon! N. Nigeria: Nupe! Jeba! S. Nigeria: Olokomeji! Lagos! Extends to Angola. Exsicc.—*Chev.* 23621; 23692. *Barter* 1533. (See Appendix).
4. **D. elata** Linn.—F.T.A. 7: 417; Knuth l.c. 265; Chev. Bot. 639. Tubers crimson-skinned; flesh red. Senegal! French Sudan! Gambia! Sierra Leone: Njala (cult.)! Gold Coast! Dahomey! N. Nigeria: Nupe! Much cultivated throughout the tropics. Exsicc.—*Dawe* 13. *Deighton* 1355; 1422. *A. S. Thomas* 25; 26; 27; 28; 29; 30; 31; 32; 33; 34; 35; 37; 38. *Barter* 1534. (See Appendix).
5. **D. colocasifolia** Pax—F.T.A. 7: 417; Knuth l.c. 294. Male flowers not known.
- S. Nigeria: Victoria, cultivated. Exsicc.—*Braun* 26.
6. **D. bulbifera** Linn. Sp. Pl. 1: 1035; Knuth l.c. 88. *D. sativa* Baker in F.T.A. 7: 415, partly of Linn. *D. anthropogagorum* A. Chev. *D. sativa* var. *sylvestris* A. Chev. Bot. 642, partly. Climber with axillary ellipsoid tubers.
- French Guinea: Futa-Jallon! Sierra Leone: Mapaki! Njala! Mabum! Kaballa! Jigaya! Gold Coast: Kumasi! Tamale! N. Nigeria: Abinsi, climber on trees at Katsina Allah! S. Nigeria: Jebba! Lagos! Oban! Fernando Po! Widely distributed in the tropics. Exsicc.—*Chev.* 18258, etc. *Deighton* 1200; 1351. *Thomas* 1538; 2220; 2679. *Vigne* 1316. *Sampson* 4. *Dalz.* 669. *Dawodu* 145. *Talb.* 131; 717. *Linder* 749. (See Appendix).
7. **D. praehensilis** Benth.—F.T.A. 7: 418, excl. var.; Knuth l.c. 299. *D. abyssinica* Chev. Bot. 639, not of Hochst. *D. togoensis* P. Knuth. Roots spiny; fruits shining, glaucous.
- Throughout the area. Exsicc.—*Dawe* 89. *Vogel* 21. *Thomas* 1719; 1732; 1762; 2243; 2408; 2605; 2645; 2796; 3167; 3833; 3613; 3879. *Sc. Elliot* 4235. *Chev.* 22218, etc. *Johnson* 1095. *A. S. Thomas* 12; 15; 20; 21. *Büthner* 104. *Warnecke* 250. *Talb.* 721; 723; 727; 728. *Foster* 329. *Farquharson* 2; 3; 4. *Dawodu* 115. *Barter* 1057; 1538. *Lely* P. 310; 492. *Dalz.* 225; 228; 671. (See Appendix).
8. **D. minutiflora** Engl. Bot. Jahrb. 7: 332; Knuth l.c. 300. *D. multiflora* Pax l.c. xv. 146, t. 8. *D. prehensilis* var. *minutiflora* Baker, F.T.A. 7: 418. *D. smilacifolia* A. Chev. Bot. 643, partly, not of De Wild. *D. echinulata* De Wild. in *Ann. Mus. Cong. Ser. v. 3*: 359, t. 56; Knuth l.c. 305. *D. pendula* Knuth.
- Sierra Leone: Yonibana! Between Mabonto and Masumbiri, N. Prov.! Liberia: near Kakatown! Bakratown! Gold Coast: Assin Yan Kumasi! Begoro, Akim, in closed forest country! S. Nigeria: Lagos! Oban! Victoria! Between Barombi and Kumba! Buea! Extends to Angola. Exsicc.—*Thomas* 4784. *Glennville* 1525. *Cummins* 207. *Irvine* 1173. *Talb.* 782. *Preuss* 54. *Maitland* 289. *Deistel* 107. *Linder* 857. (See Appendix).
9. **D. smilacifolia** De Wild. in *Ann. Mus. Congo Ser. 2*, 1: 58; Ser. 3, fasc. 2, Reliq. Dewevr. 239; Chev. Bot. 643, partly. *D. Flamini* De Wild. l.c. Ser. 5: 390, t. 57.
- Sierra Leone: Bo! Kennema! Regent! Open bush near Lester Peak! Konima! Ezi! Gold Coast: Kumasi! Assin Yan Kumasi! Assuantsi Road! S. Nigeria: Old Calabar! Ubuluku! Ido Island! Oban! Tiko! Exsicc.—*Thomas* 2081; 2343; 7434; 7620. *Sc. Elliot* 4026; 4171. *Glennville* 1526. *Plumbe* 87. *Irvine* 120; 590. *Cummins*. *Holland* 117. *Millen* 48. *Mann* 2288. *Dunlap* 180. *Chev.* 16882; 17591; 22674; 22777. (See Appendix).
10. **D. rotundata** Poir. Encycl. Suppl. 3: 139; Knuth l.c. 300. *D. Lecardii* De Wild. in *Ann. Mus. Cong. Ser. 5*, 1: 19, t. 15; var. *Chevakeri* De Wild. A luxuriant yam with fairly dark shiny foliage and more or less prickly stem; leaves lighter below; tuber with white flesh.
- Known as the "white or eight months Guinea Yam" and grown in great abundance from Sierra Leone to Angola. (See Appendix).
11. **D. cayensis** Lam. Encycl. 3: 233; Knuth l.c. 298; Chev. Bot. 640, incl. var. *sylvestris* A. Chev. Almost indistinguishable from the last except by the yellow flesh of the tubers.
- Known as the "yellow or twelve months Guinea Yam" and common in West Africa like the last species. (See Appendix).
12. **D. dumetorum** Pax—F.T.A. 7: 419; Chev. Bot. 640. *D. triphylla* var. *dumetorum* Knuth l.c. 132, fig. 28. From French Sudan to Nigeria and widely distributed in tropical Africa. (See Appendix).
13. **D. Quarantiana** A. Rich. Tent. Fl. Abyss. 2: 316, t. 36; Knuth l.c. 151. *D. Decariana* Martelli—F.T.A. 7: 420.
- N. Nigeria: Naraguta, 4,000 ft.! Vom, Bauchi Plateau! Yola Prov., Kilba! Extends to Abyssinia, Nyasaland and Angola. Exsicc.—*Lely* 246. *Dent* Young 247. *Dalz* 227.

Imperfectly known species.

- D. Caillei** A. Chev. Bot. 640, name only.
French Guinea: Kourila (Oct.). Exsicc.—*Caille* in *Herb. Chev.* 14973.

Excluded species.

- D. vespertilio** Benth in Hook. Nig. Fl. 538 (1849), is *Iligeria vespertilio* Bak. f. (*I. pentaphylla* Welw.) (*Hermandiaceae*).—See Bak. f. in Journ. Bot. 1925: 175, and corrections at the end of this Flora.

174. AGAVACEAE¹

Rootstock a rhizome; stem short or well developed. Leaves usually crowded on or at the base of the stem, often thick and fleshy, entire or with prickly teeth on the margin. Flowers hermaphrodite, polygamous or dioecious, racemose to paniculate or subcapitate, sometimes in a very large thyrse, bracteate. Perianth

¹ See Hutchinson, *Families of Flowering Plants*, 2: 151 (1934).

segments free or united; corona never present. Stamens 6, inserted at the base of the lobes or on the tube; filaments filiform or thickened, free; anthers introrse, 2-celled, opening lengthwise. Ovary superior or inferior, often beaked, 3-celled, with axile placentas; style slender. Ovules numerous and superposed in two series to solitary. Fruit a capsule or berry. Seeds with fleshy endosperm.

A new conception of this family consisting of certain genera formerly included partly in the *Liliaceae* and partly in *Amaryllidaceae*, and distinguished mainly by its habit, being somewhat intermediate between those families and the palms. The following genera are included amongst others besides those given below: AGAVE, FURCRAEA, YUCCA, CORDYLIN, PHORMIUM, POLYANTHES, etc.

Stems and leaves usually not fibrous, sometimes woody; fruit a berry; leaves flat

- | | |
|---|-----------------------|
| | 1. <i>Dracaena</i> |
| Stems and leaves often fibrous; leaves thick, sometimes terete; fruit with a thin pericarp falling away from the berry-like seeds | 2. <i>Sansevieria</i> |

1. *DRACAENA* Linn.—F.T.A. 7: 436 (incl. *Pleomele* Salisb.¹).

Leaf-blade ovate or ovate-lanceolate, broadest at or below the middle, rather abruptly narrowed into a usually long slender petiole:

Inflorescence spicate-racemose, about 10 cm. long; leaves ovate-lanceolate, gradually acuminate, 20–25 cm. long, 6–8 cm. broad, with numerous close parallel nerves and distinct transverse veins; petiole nearly as long as the blade, slender, gradually broadened into a striate sheath at the base; perianth 1.5 cm. long; fruit 2–3-lobed, fleshy 1. *humilis*

Inflorescence capitate; leaves ovate or ovate-elliptic:

Petiole winged its full length, as long as or longer than the blade; blade ovate, acutely acuminate, 10–12 cm. long, 5–7 cm. broad, with numerous parallel nerves and distinct cross-veins; perianth 1.5 cm. long; fruiting head sessile .. 2. *Elliotii*

Petiole winged only at the base and apex:

Petiole nearly as long as or longer than the blade, slender; blade mottled, ovate-elliptic, acuminate, 15–25 cm. long, 6–10 cm. broad, faintly nerved; inflorescence shortly pedunculate; bracts caudate-acuminate 3. *phrynioides*

Petiole much shorter than the blade, the latter transversely variegated, ovate-elliptic, very acutely acuminate, 12–25 cm. long, up to 14 cm. broad; inflorescence sessile, 5 cm. diam.; bracts long-acuminate; perianth 3 cm. long .. 4. *Goldiana*

Leaf-blade linear-oblancoate to obovate, widest above the middle, if elliptic then subsessile or shortly petiolate:

Leaf-blade more or less elongate-linear or linear-oblancoate; shrubs or trees:

Inflorescence a dense continuous spike furnished with long leafy bracts, the lowest bract about as long as the spike; leaves linear-oblancoate, contracted towards the expanded base, up to 40 cm. long and 3 cm. broad, with numerous transverse nerves arcuately spreading from the midrib; perianth about 3 cm. long 5. *Talbotii*

Inflorescence a loose spike of few-flowered clusters subtended by rather short ovate inconspicuous bracts; perianth-tube 1 cm. long, slender, limb 8 mm. long; leaves broadly linear, very acute, sheathing and amplexicaul at the base, about 20 cm. long and 1.5 cm. broad, 8–10-nerved on each side of midrib 6. *vaginata*

Inflorescence a panicle:

Pedicels 4–5 mm. long or more, persisting and often elongating as conspicuous pegs after the fall of the perianth:

Leaves at most about 4 cm. broad, usually about 2–5 cm. broad, very sharp at the apex, up to about 40 cm. long; perianth about 1.5 cm. long:

Inflorescence stiff; fruiting "pegs" short and stout; a tree .. 7. *Mannii*

Inflorescence very slender; fruiting "pegs" 1.5–2 cm. long, slender; a shrub .. 8. *scoparia*

Leaves 6–7 cm. broad, very long, with very numerous subcontiguous nerves; bracteoles persistent on the infructescence 9. *arborea*

Pedicels very short and inconspicuous:

Perianth about 1 cm. long, rather slender; bracteoles numerous, persistent and conspicuous, lanceolate; nerves of the leaves contiguous or nearly so 10. *Smithii*

Perianth 1.5–2 cm. long, stout and club-shaped in bud; bracteoles few, inconspicuous; nerves of the leaves distinctly separated, with oblique transverse veins 11. *fragrans*

Leaf-blade elliptic to obovate or rarely broadly oblanceolate:

Flowers arranged in dense spikes or small panicles of clusters:

¹ The late N. E. Brown (Kew Bull. 1914: 273) separated *Pleomele* Salisb. from *Dracaena* proper. I have examined every species of these two genera and consider *Dracaena* as defined by Brown to be artificial. The character of the expanded or filiform filaments is not constant, and the slight difference of no tube or a very short one is to my mind insufficient for generic separation.

Leaves spirally arranged and crowded, with very short internodes; petioles long and winged; inflorescence densely spicate:

Outer bracts abruptly cuspidate-acuminate; inflorescence short and subglobose; perianth-segments as long as the tube 12. *bicolor*

Outer bracts gradually pointed; inflorescence cylindric, at length elongating; perianth-segments half as long as the tube; fruits vertically bilobed or lobe suppressed, about 3 cm. long 13. *cylindrica*

Leaves subverticillate, whorls distant from each other and with numerous scars or leaf-sheaths between:

Leaves broadly oblanceolate, gradually narrowed to the base, about 15 cm. long and 5 cm. broad, with spaced parallel nerves and very faint oblique veins; inflorescence zigzag, up to 30 cm. long; clusters of flowers subsessile on the axis, several flowers together; perianth about 2 cm. long . . . 14. *camerooniana*

Leaves elliptic or oblong-elliptic to broadly elongate-oblanccolate, more or less abruptly narrowed at each end:

Inflorescence sessile or subsessile, subcapitate; perianth 3-5 cm. long; leaves 15-25 cm. long, 4-8 cm. broad, with spaced parallel nerves . . . 15. *ovata*

Inflorescence on slender peduncles, capitate or subcapitate or rarely shortly racemose; pedicels slender, jointed towards the base; perianth 2 cm. long; leaves very acutely acuminate, averaging about 10 cm. long and 4-5 cm. broad, with spaced parallel nerves 16. *surculosa*

Flowers arranged in a very lax panicle and not clustered on the axes; pedicels very slender, jointed at the top, about 1-5 cm. long; perianth about 1 cm. long in bud; leaves elliptic or oblong-elliptic, rather abruptly subulate-acuminate, cuneate at the base, 7-16 cm. long, 3-6 cm. broad, with spaced parallel nerves 17. *laxissima*

1. *Dracaena humilis* Baker—F.T.A. 7: 444; Chev. Bot. 646. *D. Poggei* A. Chev. Bot. 647, not of Engl. *Pleomele humilis* N.E.Br. Herb, often in dense forest; fruits 2-3-lobed, greenish-yellow or red; roots violet-scented.
Sierra Leone: Bagroo R. (Apr.)! Liberia: Dukwia R. (fr. Feb.)! Ivory Coast: Grabo (Aug.)! Guébo (Feb.)! Gold Coast: E. Akim! Blanka, Ashanti! S. Nigeria: Bamenda (fr. Apr.)! Extends to Gabon. Exsicc.—Chev. 17030; 19741. Mann 898. Cooper 168. Johnson 763. Irvine 491. Martland 1714. (See Appendix).
2. *D. Elliottii* Baker—F.T.A. 7: 449. *Pleomele Elliottii* N.E.Br. *D. ovata* A. Chev. Bot. 646, not of Gawl. Stems woody, about 1 ft. high; inflorescence sessile; petiole winged.
French Guinea: Konkouré to Timbo (Mar.)! foot of Mt. Nzo (Mar.)! Sierra Leone: Kukuna, in thick bush (Jan.)! Kambui Reserve (Feb.)! Kennema (Jan.)! Liberia: Peáhtah! Exsicc.—Chev. 12557 bis.; 21017. Sc. Elliot 4689. Lane-Poole 346. Thomas 7466. Carder. Linder 1063. (See Appendix).
3. *D. phrynioides* Hook. Bot. Mag. t. 6352; Chev. Bot. 647—F.T.A. 7: 447; Holl. 4: 703. *Pleomele phrynioides* N.E.Br. About 2 ft. high from a rhizome; leaves mottled; flowers white in a sessile head subtended by purple bracts.
Ivory Coast: Guidéko to Zozro! foot of Mt. Momy! S. Nigeria: Oshugbo-Oke Ibode road (fr. Mar.)! Fernando Po! Exsicc.—Millson. Mann 417. Chev. 19048; 21365.
4. *D. Goldieana* Link—F.T.A. 7: 449; Bot. Mag. t. 6630; Holl. 4: 702. *Pleomele Goldieana* N.E.Br. About 1 ft. high; leaves in a cluster, with transverse green bars; flowers white, in a sessile terminal cluster.
S. Nigeria: Cross River Division! Exsicc.—Holland 195. Hort. Kew. (See Appendix).
5. *D. Talbotii* Rendle in Cat. Talb. Nig. Pl. 112. *Pleomele Talbotii* N.E.Br. Remarkable for its elongated sharply acuminate leaves and dense spikes with large bracts.
S. Nigeria: Oban! Exsicc.—Talb. 1532.
6. *D. vaginata* Hutch. in Kew Bull. 1936: ined. Leaves rather crowded, sheathing for 1 cm! at the base; inflorescence about 9 cm. long.
S. Nigeria: Oban! Exsicc.—Talb. 729.
7. *D. Mannii* Baker—F.T.A. 7: 438; Holl. 4: 703. *D. Perrottetii* Baker and var. *minor* Baker; Chev. Bot. 647. *Pleomele Mannii* and *P. Perrottetii* N.E.Br. *D. buxana* Engl.? *D. arborea* Chev. Bot. 645, not of Link. *D. fragrans* A. Chev. Bot. 646, partly, not of Gawl. A copiously branched tree up to 30 ft. high; flowers in lax panicles, scented; fruits red; in wet situations in closed forest.
Senegal: Casamance. French Guinea: Conakry and Iles de Los. Sierra Leone: Bo (May)! Gold Coast: various localities! Ivory Coast: Mbago; Bouroukrou. S. Nigeria; various localities! Cameroons Mt.? Exsicc.—Chev. 2575; 13302 bis.; 22104; B. 22422, etc. Lane-Poole 189. Thomas 9591. Johnson 687; 870. Perrottet 785. Chipp 193. Vigne 1634. Hunter 45. Irvine 315. Mann 2329. Thomson 8. Barter 1511. Mildred 10571. Talb. 729. Thompson 506. (See Appendix).
8. *D. scoparia* A. Chev. Bot. 647, name only. A shrub 10-15 ft. high, with white flowers and green at length red fruits.
Ivory Coast: Erymaougnié (Jan.)! Alépé! Gold Coast: Axim, undergrowth of evergreen forest! Exsicc.—Chev. 16967; 17484. Irvine 1097; 2181. (See Appendix).
9. *D. arborea* Link—F.T.A. 7: 439; Chev. Bot. 645. *Pleomele arborea* N.E.Br. Tree about 40 ft. high.
Sierra Leone: Kannah country! Ivory Coast: Morenou (Nov.). Gold Coast: Kumasi, Ashanti! S. Nigeria: Nun River (Aug.)! Oban! Eket! Extending to Angola and in St. Thomas Island. Exsicc.—Burbridge 483. Cummins 167. Mann 454. Talb. 74; 3034.
10. *D. Smithii* Baker ex Hook f. Bot. Mag. t. 6169.—F.T.A. 7: 440. *Pleomele Smithii* N.E.Br. *D. fragrans* A. Chev. Bot. 646, partly, not Gawl. A small tree used for fences; leaves up to 3-4 ft. long; flowers in clusters on the panicle, pale yellow.
French Guinea: Timbo, Kouria, etc.! Sierra Leone: Bathurst (Jan.)! Exsicc.—Dolz. 8254. Deighton 2452; 2453. Chev. 12391; 12709; 12800; 13546; 13587; 14783; 14784. (See Appendix).
11. *D. fragrans* Gawl. in Bot. Mag. t. 1081; Holl. 4: 704. *D. Deisteliiana* Engl. *Pleomele fragrans* Salisb. Like the last, but flowers white, fragrant.
Gold Coast: Aburi Hills! Togo: N. Nigeria: Bauchi Plateau; Pankshin, on stream banks (Dec.)! Umbulubu (Feb.)! Oban! Cameroons Mt.: forest at 5,000 ft. (Feb.)! Fernando Po; Moka, Crater Lake, 5,700 ft. (Jan.)! Widely spread in tropical Africa. Exsicc.—MacGregor 437. Thomas 2305. Talb. 1412; 2402. Mann (cult. Kew). Dolz. 8348. Johnson 730. Kersting A360. Lehmach 16. Deistel 497. Ezell 809. (See Appendix).
12. *D. bicolor* Hook. in Bot. Mag. t. 5248; F.T.A. 7: 448. *Pleomele bicolor* N.E.Br. Tree 12-15 ft. high; leaves up to nearly 2 ft. long with a broadly winged petiole and numerous close nerves and distinct cross-nerves; head dense about 4 cm. diam.
Fernando Po (Dec.)! Exsicc.—Mann 98. Cult. Hort. Kew. (See Appendix).



FIG. 316.—*DRACAENA SURCULOSA* Lindl. (AGAVACEAE).
 A, flower laid open. B, perianth-segment and stamen. C, stamen. D, stigma.
 E and F, fruits.

13. *D. cylindrica* Hook. f. in Bot. Mag. t. 5846; F.T.A. 7: 448. *D. Preussii* Engl. *Pleomele cylindrica* N.E.Br. Herb or shrub up to 12 ft. high; very like the preceding species.
Gold Coast: Tano-Ofin Forest Reserve (Feb.)! S. Nigeria: Peregun (Jan.)! Old Calabar (Feb.)! Eket! Oban! Barombi! Exsicc.—Lyon 2873. Dodd 397. Mann 2328. Thomson 17. Preuss 328. Talb. 1322; 2402; 2404. (See Appendix).
14. *D. camerooniana* Baker—F.T.A. 7: 442; Chev. Bot. 646. *Pleomele camerooniana* N.E.Br. A shrub up to 15 ft. high.
French Guinea: Kouria and various other localities in the Futa-Jallon! Sierra Leone: Lumbaraya, Talla Hills! Bayabaya (Feb.)! Yonibana! Liberia: Gbanga (Sept.)! Ivory Coast: Cavally Basin (Aug.)! Gold Coast: Asamankese (Jan.)! S. Nigeria: Sapoba (May)! Oban! Cameroons Mt., 3,500 ft.! Barombi! Extends to Gabon. Exsicc.—Chev. 14967; 19806; 23015. Sc. Elliot 4551; 5009. Thomas 4169. Plumptre 76. Kennedy 1135. Talb. 730; 1421; 3032; 3667. Mann 1204. Preuss 146. Linder 765.
15. *D. ovata* Gavl. in Bot. Mag. t. 1179 (by error 1180).—F.T.A. 7: 449. *D. Afzelii* Baker. *D. prolata* and *D. sessiliflora* C. H. Wright. *Pleomele prolata* N.E.Br. Shrub with clusters of leaves and a head of fragrant white flowers.
Sierra Leone: Huddle's Farm, common in undergrowth (Feb.)! Near Mano (fr. Nov.)! Liberia: near Monrovia! Since Basin! Dukwia R.! Pehatlah! S. Nigeria: Eket! Exsicc.—Lane-Poole 155. Deighton 2412. Thomas 8444. Dalz. 987. Whyte. Cooper 170. Talb. 8191. Afzelius. Linder 1031. (See Appendix).
16. *D. surculosa* Lindl. in Bot. Reg. t. 1189.—F.T.A. 7: 443; Chev. Bot. 647; Holl. 4: 703. *D. Godseffiana* Sander ex Baker; Holl. 4: 702. *Pleomele surculosa* and *P. Godseffiana* N.E.Br.
A common climber or straggly shrub in shady woods and ravines throughout the area; leaves green or mottled; flowers white or greenish. (See Appendix).
17. *D. laxissima* Engl.—F.T.A. 7: 446. *D. elegans* Hua—F.T.A. 7: 446; Holl. 4: 702. *Pleomele laxissima* and *P. elegans* N.E.Br. Differs from all the other species known from the area in its lax panicles of flowers on slender pedicels.
S. Nigeria: Ikpoba (June)! Eket! Oban! Bamenda, 3,500 ft.! Extends to the French Congo and in St. Thomas. Exsicc.—Farquhar 13. Talb. 2405. Maitland 1686. (See Appendix).
- Imperfectly known species.*
- D. densifolia* Baker—F.T.A. 7: 447. The specimen from Fernando Po collected by Mann and included by Baker in this species is not the same as the type from Gabon. It consists of an old inflorescence without leaves.

2. SANSEVIERIA Thunb.—F.T.A. 7: 332; N.E.Br. in Kew Bull. 1915: 185.

- Perianth about 8–10 cm. long; flowers in a dense continuous broad spike-like raceme; leaves flat, broadly oblanceolate, about 45–50 cm. long and 6 cm. broad, with hardened red-brown margins when dry; pedicels jointed above the middle; bracts 1–2.5 cm. long, thin and membranous. 1. *longiflora* var. *fernandopensis*
- Perianth at most 5 cm. long; flowers in interrupted racemes:
- Perianth 5 cm. long; pedicels jointed above the middle; lower bracts broadly lanceolate, about 4 cm. long, persistent, upper bracts much smaller; leaves broadly oblanceolate, marked with transverse dark and light green bands, up to 10 cm. broad 2. *liberica*
- Perianth at most 3 cm. long:
- Leaves markedly banded with green and yellow, elongated-oblanceolate, up to 50 cm. long or more and 5 cm. broad; pedicels jointed a little above the middle; bracts small and membranous 3. *trifasciata*
- Leaves not banded or only slightly so, up to 40 cm. long and 5 cm. broad; pedicels jointed about the middle; bracts small and membranous 4. *senegambica*
1. *S. longiflora* var. *fernandopensis* N.E.Br. in Kew Bull. 1915: 257. Stemless with a creeping rootstock; lower bracts with sharp slender points; inflorescence about 1 ft. long.
Fernando Po! The species, which differs but slightly, occurs in the Congo and Angola. Exsicc.—Mann 1169. Barter 2060.
2. *S. liberica* Gér. & Labr. in Bull. Mus. Hist. Nat. Par. 1903: 170, 173, fig. 4; N.E.Br. l.c. 247. *S. chinensis* Gentil; N.E.Br. l.c. 242. *S. metallica* Holl. 698, not of Gér. & Labr.
Sierra Leone: abundant on rocks at Scarces River, Sassani (Jan.)! "Coast" (Dec.)! Liberia. Gold Coast: behind the beach at Accra (July)! Behind the seashore at Christiansborg (Sept.)! Akuse (June)! Half Assinie, on the beach! N. Nigeria: Yola (May)! Nupe; common in hot rocky plains! Exsicc.—Sc. Elliot 4532. Dave 408. Thomas 7329. Irvine 747; 864. Dalz. 162; 231. Chipp 296. Barter 1508.
3. *S. trifasciata* Prain Bengal Plants 2: 1054; N.E.Br. in Kew Bull. 1915: 239; Holl. 698. *S. guineensis* Gérome & Labroy, not of Willd. *Aletris guineensis* Jacq. Hort. Vindobon. 1: 36, t. 84. Stemless with a creeping rootstock; leaves transversely banded with dull green or clear whitish green to almost blackish green.
S. Nigeria: Oban distr.! Exsicc.—Talb. and numerous cultivated specimens.
The var. *Laurentii* N.E.Br. occurs in the Congo; the leaves of this are longitudinally and not transversely striped.
4. *S. senegambica* Baker—F.T.A. 7: 332; N.E.Br. in Kew Bull. 1915: 235. *S. guineensis* A. Chev. Bot. 633, not of Willd. *S. libericiensis* M. Cornu ex A. Chev. Bot. 633, name only. *S. Cornui* Gér. & Labr.
Senegal: Sebikoutane (Dec.)! Casamance! Gambia: Foni distr., usually on shady ant hills! French Guinea: Kindia (Mar.)! Sierra Leone: Sugarloaf Mt., etc. (Dec.)! Ivory Coast: Mankono (June)! Baoulé-Nord; Mt. Lémélébou, 500 ft. (July)! Liberia: Pehatlah! Exsicc.—Perrotet. Richard. Dave 75. Dalz. 8253. Sc. Elliot 3980. Chev. 2563; 2579; 2580; 12782; 21860; 22105. Linder 1031. (See Appendix).
- According to N. E. Brown (l.c.) *S. guineensis* Willd. is a South African species and synonymous with *S. thyrsiflora* Thunb.

175. PALMAE

Stems stout or slender, sometimes climbing, sometimes very short, often covered by the persistent bases of the leaves; primary root soon disappearing and replaced by roots from the base of the stem. Leaves in a terminal cluster or in climbing species scattered, sometimes very large, entire or pinnately or

digitately divided, the segments or leaflets folded induplicately or reduplicately in bud, often prickly on the margins; rhachis sometimes extended at the apex and bearing hooks. Flowers small, hermaphrodite to dioecious, mostly paniculate. Spathes (bracts) various, leathery or membranous; bracteoles often connate below the flowers. Perianth double. Sepals 3, separate or connate, imbricate or open. Petals 3, usually valvate in the male and imbricate in the female flowers. Stamens usually 6, in two series, rarely numerous. Ovary superior, 1-3-celled, rarely 4-7-celled, or carpels 3 and free or nearly so. Ovule solitary and erect or pendulous. Fruit a berry or drupe, 1-2-celled, or fruiting carpels distinct; exocarp often fibrous, sometimes covered by reflexed scales. Seed with sometimes ruminant endosperm and small embryo.

Tropics and warm temperate regions.

Leaves pinnate, pinnatisect or bifurcate:

Stems erect, not climbing:

Leaf-segments reduplicate in veneration:

Lateral leaflets narrowly rhomboid-oblancoate, doubly dentate in the upper part, terminal leaflet broadly cuneate-rhomboid 1. *Podococcus*

Lateral leaflets linear or ensiform:

Fruits covered with retrorsely imbricate scales, without pores 2. *Raphia*

Fruit not covered with scales; endocarp with 3 pores above the middle:

Male flowers sunk in pits on the spadix; pericarp spongy 3. *Elaeis*

Male flowers not sunk in pits; pericarp thick, fibrous 4. *Cocos*

Leaf-segments induplicate in veneration 5. *Phoenix*

Stems climbing:

Leaf-rhachis not prolonged into a cirrus; inflorescences borne on slender leafless branches armed with prickles 6. *Calamus*

Leaf-rhachis prolonged into a cirrus armed with hooks:

Spathe absent; spadix axillary 7. *Eremospatha*

Spathe present:

Spadix axillary 8. *Oncocalamus*

Spadix terminal 9. *Ancistrophyllum*

Leaves fan-shaped:

Male flowers many in pits on the spadix 10. *Borassus*

Male flowers solitary in pits on the spadix 11. *Hyphaene*

1. *PODOCOCCLUS* Mann & Wendl.—F.T.A. 8: 99.

A very slender plant; leaves pinnate; leaflets alternate, the lateral ones narrowly rhomboid-oblancoate, the wedge-shaped basal part entire, the upper part doubly dentate, up to 30 cm. long and 10 cm. broad, glabrous, the terminal leaflet broadly cuneate-rhomboid; rhachis shortly hirsute; male spadix slender, the flowering part about 30 cm. long, the peduncle nearly as long, pubescent; female similar to the male; fruit narrowly oblong-cylindric, with a subbasal stigmatic scar, 2.5 cm. long, 6 mm. diam. *Barteri*

P. Barteri Mann & Wendl.—F.T.A. 8: 100. A slender elegant palm up to 15 ft. high; spadix simple; both sexes on the same plant (*Barteri*).

S. Nigeria: mouth of the Brass River! Left bank of the Nun River (Aug.). Also in Gabon. Exsicc.—*Barteri* 36; 1837. Mann 452. (See Appendix).

2. *RAPHIA*¹ P. Beauv.—F.T.A. 8: 104; Martelli in Webbia 3: 37 (1910);

A. Chev. in Rev. Bot. Appliq. 12: 198 (1932).

Stemless or almost stemless, with a single rosette of leaves from the ground 1. *humilis*
Stems present, sometimes very tall:

Ultimate branchlets of the spadix very short and crowded, scarcely exerted from the bracts; fruits very narrow, oblancoate in outline 2. *sudanica*

Ultimate branchlets longer and well exerted from the bracts:

Actual stem quite short, a false stem being formed by the leaves; leaves nearly erect 3. *gracilis*

Actual stem 3 m. or more high, not formed by the leaves:

Comparatively dwarf palm (trunk not more than 3 m. or so):

Stems solitary from the rootstock:

Stems about 3 m. high; stamens 8 4. *Palma-Pinus*

Stems taller; stamens 10 5. *vimifera*

Stems 2 or more from a creeping rhizome 6. *sassandrensis*

¹ The above key to *Raphia* should be regarded as merely tentative. The material in herbaria is very inadequate, and to arrive at a proper understanding of the species a great amount of observation and collecting in the field would be necessary.

Tall palms 8 m. or more high :

Trunk not covered by leaf-fibres. 7. *bandamensis*

Trunk covered with the black fibres of the withered leaves :

Fruits with about 6 series of scales 8. *gigantea*

Fruits with about 12-15 series of scales 9. *Hookeri*

1. *Raphia humilis* A. Chev. in Rev. Bot. Appl. 1932 : 204. A stemless or almost stemless palm, not shooting out from the base, always with a single rosette of leaves; leaves 6-10 ft. long, with 40-50 pairs of leaflets, these usually rigid to the base of the very spiny rachis and glaucous, 50 cm. long, 2.5 cm. broad, very stiff, prickly on the margin and midrib; spadix with a curved peduncle, drooping, nearly as broad as long, with very crowded branches; branches bearing a few female flowers at the base, and numerous male flowers above; male flowers 2.2-2.4 cm. long; calyx 5-9 mm., dry; petals linear, apiculate, 13-15 mm. long; stamens 10-12; anthers 6 mm. long; female flowers 10-12 mm. long; calyx cupular, 6 mm. long; corolla 9 mm. long; fruit oblong or obovoid, broader at the top, 3.5-6 cm. long, with a point 1 cm. long, 2-2.5 cm. diam.; scales in about 10 series, finely fimbriate-ciliate, rhomboid, 9-10 mm. long, 7-9 mm. diam.; seeds 1-3.

Upper Dahomey : Agouagou, common in savannah swamps (May) ! Savé, in swamps below the Atacora Mts. ! (See Appendix).

2. *R. sudanica* A. Chev. in Bull. Soc. Bot. Fr. Mém. 8b : 95 (1908); and in Rev. Bot. Appl. 1932 : 206, pl. vii. A stout palm up to 3 m. or sometimes up to 12 m. high; petiole woody (not fibrous) at the base; spadix about 1.5 m. long; ultimate branchlets of the stout spadix very short and crowded, scarcely exerted from the bracts, the latter very wide, truncate, pointed at one end; fruits very narrow, oblanceolate in outline, 6-7 cm. long, 2.5 cm. diam., narrowed to the base, with a very thick beak about 7 mm. long; larger scales in 9-10 rows, broadly ovate, the margins at the base jagged-fimbriate; lateral branches of the spadix very stout, about 30 cm. long and 8 cm. broad; leaflets numerous, linear, with numerous small prickles on the margin; male flowers with 10-12 stamens.

French Guinea: Koulikoro! Futa-Jallon; Timbo and neighbourhood, 1,800-3,000 ft. ! Kollangui (Mar.) ! Exsicc.—Chev. 12531; 12867. *Rogean*. (See Appendix).

According to Chevalier (Rev. Bot. Appl. 1932 : 206) there exists in the Upper Niger and Volta Region another *Raphia* with a low stem and short ovoid fruits, known by the same vernacular name as *R. sudanica* (*Ban*); it yields wine and the rachis of the leaves for making native beds. It extends to Bamako and Kita, and south as far as the forest belt. We have seen no material of this species.

3. *R. gracilis* Becc. in Agric. Colon. 1910 : t. v, fig. 7-8, and in Webbia 3 : 92, fig. 6, 1 a-b; A. Chev. in Rev. Bot. Appl. 12 : 210 (1932); *R. Gaertneri* C. H. Wright in F.T.A. 8 : 106, partly.

A medium-sized tree; leaves somewhat upright, rigid, armed with strong prickles along the midrib and margins of the leaflets, the latter linear, those about 1 ft. from the apex of the leaf about 50 cm. long and 2 cm. broad, the teeth very sharp, ascending and averaging about 2 cm. apart; spadix much branched, the ultimate branchlets quite short, curved, up to 6 cm. long; bracteoles obliquely truncate, about 3.5 mm. long; calyx lobes; petals about 1 cm. long; fruit oblong-ellipsoid, abruptly beaked, 8-9 cm. long, 5 cm. diam., covered with about 3 spirals of triangular-rhomboid shining scales distinctly grooved in the middle, and about as many series of small scales on beaked apex; inner shell of fruit thin and crustaceous; seed a little smaller than the fruit, grooved.

Senegal: Casamance; Ile du Diable! French Guinea: Kindia (Mar.) ! Sierra Leone: Berria (Feb.) ! near Kaballa ! Pendembu ! Dodo, near Sembehun (Nov.) ! near Panguma (Nov.) ! Exsicc.—Deighton 2398; 2979. *Sc. Elliot* 5002. *Thomas* 858. *Glanville*. Chev. 13023; 13125.

According to Deighton (No. 2979) this palm reaches 30 ft. in height, but the real trunk is only about 2 ft. high, the main bulk being a false stem formed by the leaf-stalks. It occurs throughout the Kenema district of Sierra Leone, and is common near Sembehun; he says it is readily distinguished by its yellowish-green leaves.

4. *R. Palma-Pinus* Hutch. in Kew Bull. 1936 : ined. *Sagus Palma-Pinus* Gaertn. Fruct. et Sem. 1 : t. 10, fig. 1. *R. Gaertneri* Mann & Wendl. in Trans. Linn. Soc. 24 : 437, t. 42, fig. D.—F.T.A. 8 : 105, partly.

Dwarf palm, rarely exceeding 10 ft. in height (*Chipp*), in swamps; leaflets more or less as in *R. vinifera*? ultimate branchlets of spadix short and slender, about 8 cm. long; bracts obliquely truncate; bracteoles small, pointed on one side, about 8 mm. wide, the margin minutely ciliate-fimbriate; fruit oblong-elliptic, subabruptly beaked, about 3 cm. long and 4 cm. diam., covered by about 8 spirals of rhomboid-triangular shining scales faintly grooved down the middle, and with about the same number of spirals of small scales on the beak, the latter 1 cm. long and rather slender.

Liberia. Gold Coast: Bonaso, east of Tarquah! Exsicc.—Chipp 428. *Dinklage*.

5. *R. vinifera* P. Beauv. Fl. Owar. 1 : 77, t. 44, fig. 1, t. 45; t. 46, fig. 1; Mann & Wendl. in Trans. Linn. Soc. 24 : 437, t. 42, fig. C; A. Chev. in Rev. Bot. Appl. 12 : 208 (1932).—F.T.A. 8 : 106.

A medium-sized tree; leaves large; spathe 3, the outer truncate, the intermediate bifid at the apex, the third campanulate; spadix large, much-branched, branches curved, slender; bracts widely truncate; flowers monocious; stamens 6-12; female flowers with a tridentate calyx; fruit oblong-ellipsoid, sharply pointed, about 8 cm. long and 4 cm. diam.; scales rhomboid-triangular, with membranous margins, grooved in the middle; seed sulcate.

Originally described from the Owari district of Benin, Southern Nigeria, where it is said to be very abundant on the banks of creeks. The accompanying drawing is a copy of Beauvois' plate 44. In the Kew Museum, No. 1, there is a portion of the inflorescence of this species. Good herbarium material is much desired. (See Appendix).

6. *R. sassandrensis* A. Chev. in Rev. Bot. Appl. 1932 : 199.

Rhizomes creeping and producing usually from 2-10 trunks attaining to from 5-8 m. high and 30-40 cm. diam.; trunks covered by a rosette of 30-50 erect leaves 3-5 m. long; spadix 2 m. long at flowering time, subcylindric with numerous branches 15-20 cm. long and bearing female flowers at the base and numerous male flowers above; male flowers 1.5-2 cm. long; stamens 16-21; anthers 6-7 mm. long; female flowers ovoid-oblong, 2-2.5 cm. long; fruit yellowish, ovoid-oblong, with about 12 series of scales.

Ivory Coast: Guidéko; basin of the Sassandra! Exsicc.—Chev. 19095.

7. *R. bandamensis* A. Chev. in Rev. Bot. Appl. 1932 : 205.

A tall palm up to 25 ft. not tufted; trunk not covered by leaf-fibres; leaves 12-15 m. long; petiole 8-10 cm. across, 5-6 m. from the base, channelled above; spadices unisexual, long, cylindric, pendulous; bracts large, oval; male flowers with a corolla 12-15 mm. long; fruit oblong-turbinate, 7.5-8 cm. long, 4 cm. diam., obliquely mucronate about 10-12 mm.; scales in 9-11 series, reddish shining, with paler margins and finely fimbriate, obtuse or emarginate.

Ivory Coast: Bandama, near Mankono, Béré Valley (probably also in Baoulé, fide Chevalier). (See Appendix).

8. *R. gigantea* A. Chev. in Rev. Bot. Appl. 1932 : 198. *R. Hookeri* var. *mancipiorum* Becc. in Agricolt. Colon. 4 : t. iv, fig. 6 (1910). *R. Hookeri* A. Chev. in Rev. Bot. Appl. 1932 : 200, pl. vi. not of Mann & Wendl.

Tall palm up to 40 ft., the stem covered with the black fibres of the fallen leaves; leaves erect, 10-13 m. long; leaflets up to 3.5 m. long, 5 cm. broad, linear, armed with sharp prickles on the margin and midrib, the upper ones subopposite; spadices 2-3 m. long, very stout, the main axis 2.5 cm. diam. about 30 cm. from the top, bearing about 40 secondary branches in 4 rows and covered with amplexicaul sheaths triangular-pointed at each side, the free portion about 2.5 cm. long; ultimate branches in 4 rows about 20 cm. long;



FIG. 317.—Copy of original figure of *RAPHIA VINIFERA* P. Beauv.
A, fruit. B, portion of shell of fruit. C, seed.

bracteoles truncate but obtusely pointed at each side, the free portion about 6 mm. long, the tips nearly 2 cm. across; calyx very shallowly lobed; petals 2 cm. long, with thick cucullate tips; fruit oblong-ellipsoid, 6–10 cm. long and 4 cm. diam., covered by about 6 spirals of larger rhomboid shining scales faintly grooved in the middle and about as many more series of much smaller scales on the rather abruptly beaked apex, the latter 1 cm. long; inner shell of fruit thin and crustaceous; seed a little smaller than the fruit, irregularly grooved.

Ivory Coast: Bingerville, Dabou! Bouroukrou! Gold Coast: Adiambra, Western Ashanti, occasional in "monsoon" forest! Kumasi! Volta River! Exsicc.—*Chipp* 134 (fr.) and *Chipp* (without number—leaves and inflorescence). *Chev.* 15488; 15489; 15496; 15497; 16530, and without number.

9. *R. Hookeri Mann & Wendl.* in Trans. Linn. Soc. Bot. 24: 438, t. 39, fig. 13, t. 42, fig. A.—F.T.A. 8: 107. A tall palm about 23 m. high, the actual stem about 10 m. high; leaves 13 m. long, arcuate, petiole with frilled margins; leaflets about 1.5 m. long, about 5 cm. broad, midrib prickly towards the base and apex; spadices usually 2, pendulous from the top of the stem, cylindric, with 55–60 primary branches up to 30 cm. long; male flowers 2 cm. long; fruit broadly oblong-ellipsoid, abruptly beaked, about 10 cm. long and 5 cm. diam., covered with 12–15 rows of slightly sulcate scales; seed about 7 cm. long, grooved.

S. Nigeria: in humid places along the coast at Old Calabar and the Cameroons and in the Gabon.

3. ELAEIS Jacq.—F.T.A. 8: 124.

Erect; stem stout; leaves several in a terminal crown, up to about 5 m. long, pinnate, arching; leaflets alternate or subopposite, ensiform, entire, glabrous; lower leaf-bases spinescent; midrib distinct, with 2–3 distinct secondary nerves on each side: male spadices densely clustered, averaging about 10 cm. long, long-acuminate at the apex, nearly 1.5 cm. diam.; bracts subulate-acuminate; female spadices aggregated into an ovoid acutely pointed cluster; bracts rigid-acuminate, acute; seed obliquely ovoid, acuminate, 3–4 cm. long, enveloped by the reticulately branched raphe

guineensis

E. guineensis Jacq.—F.T.A. 8: 125; Holl. 4: 734. *E. nigrescens* A. Chev. *E. virescens* A. Chev.

The West African oil palm, of which there are numerous forms; widely cultivated. (See Appendix).

4. COCOS Linn.—F.T.A. 8: 126.

A tall tree up to about 30 m. high; leaves in a cluster at the top of the stem, pinnate; leaflets linear, entire; flowers unisexual *nucifera*

C. nucifera Linn.—F.T.A. 8: 126.

The well-known coco-nut palm; cultivated. (See Appendix).

5. PHOENIX Linn.—F.T.A. 8: 102.

Fruit fleshy, ellipsoid, 3–5 cm. long, with a thick sweet pericarp; leaves about 3 m. long or more, glaucous; leaflets lanceolate-linear, acuminate, the middle ones the longest; flowers dioecious, paniculate 1. *dactylifera*

Fruit dry, oblong-ellipsoid, about 2 cm. long when dry, depressed and mucronate at the apex, endocarp thin and crustaceous; seed about 1.3 cm. long, deeply grooved down one side; leaves up to about 3 m. long; lower leaflets spinescent, the remainder linear, very acute, induplicate, glabrous; flowers dioecious, arranged in a close panicle of spikes; inflorescence at first enclosed by a rigid spathe; spikes very wavy; sepals triangular, about 2 mm. long; petals elliptic, 7 mm. long, broadened and denticulate at the apex. 2. *reclinata*

1. *P. dactylifera* Linn.—F.T.A. 8: 102.

The date palm, cultivated. (See Appendix).

2. *P. reclinata* Jacq. Fragm. 1: 27, t. 24.—F.T.A. 8: 103; Chev. Bot. 672. *P. spinosa* Schum. & Thonn.—Chev. Bot. 672.

A common palm from Senegal southwards, and in other parts of tropical Africa; also in South Africa. (See Appendix).

6. CALAMUS Linn.—F.T.A. 8: 107; see also Beccari in Records Bot. Surv. India 2: 197 (1902), and Monogr. of Calamus in Ann. Bot. Gard. Calc. 12 (1908).

Leaflets elongate-linear-lanceolate, up to 30 cm. long and 2.5 cm. broad, acutely acuminate, with fine subulate teeth on the margin and often on the lower surface; rhachis armed with sharp recurved hooks but not ending in a cirrhous; spadices borne on slender leafless branches armed with numerous recurved hooks; branches of spadix short, about 5 cm. long; bracteoles obliquely truncate; calyx trilobed, lobes ovate; fruit oblong-ellipsoid, pointed, 1.5–2 cm. long, with about 15 spirals of triangular-ovate scales, the scales with fimbriate margins *deerratus*

- C. deerratus* Mann & Wendl. in Trans. Linn. Soc. 24: 429, t. 41, fig. F.—F.T.A. 8: 108; Chev. Bot. 673. *C. Barteri* Becc. ex Drude—F.T.A. 8: 109. *C. Heudelotii* Becc. ex Drude—F.T.A. 8: 110. *C. akimensis*, *C. fahabensis*, *C. Leprieurii*, *C. Perrottetii*, and *C. Schweinfurthii* Becc. A slender climber to tops of forest trees; stems prickly.

French Sudan! French Guinea! Senegal: Cayor! Gambia! Sierra Leone: Musala! Bagroo R.! Peper! Jigaya! Liberia: near Kakatowa! Ivory Coast! Gold Coast: Amentia, Ashanti! Sampa, near Tarkwa! Axim! S. Nigeria: Cameroons R.! Onitsha! Also in French Cameroons, Eastern Sudan and Uganda. Exsicc.—*Ingram*. *Heudelot* 372. *Mann* 895; 2147. *Sc. Elliot* 4738; 5121. *Deighton* 1847. *Thomas* 2753. *Vigne* 2763. *Johnson* 242. *Cummins* 128. *Dennett* 8. *Unwin* 223. *Barter* 110. *Perrottet* 761. *Smeathmann*. *Kinloch* 13; 15; 18.

7. EREMOSPATHA Mann & Wendl.—F.T.A. 8: 111.

Leaflets obovate-oblancoolate, subtriangular at the apex, the sides of the cuneate portion more or less rounded, 10–14 cm. long, up to 6 cm. broad, entire or with

several sharp teeth on the margin; rhachis produced into a slender cirrhus armed with reflexed opposite spines about 3 cm. long and sometimes with a few small recurved prickles towards the base; spadix with several branches, slightly scabrid; branches with very short nodes; fruit narrowly ovoid-oblong, about 3 cm. long, with about 15 spirals of rhomboid scales; seed oblong-elliptic, peltate, 2 cm. long

1. *Hookeri*

Leaflets rhomboid, the sides of the cuneate portion quite straight, the apex ovate-triangular and toothed, about 15 cm. long and 10 cm. broad, with numerous parallel transverse veins; rhachis as above; spadix not seen 2. *Wendlandiana*

Leaflets elongate-linear-lanceolate, pointed at each end, 15-35 cm. long, 2-3 cm. broad, with about 15 parallel nerves and numerous sharp subulate teeth on the margin; rhachis as in *E. Hookeri*; spadix with very few short lateral branches; flowers crowded, paired, sessile; calyx campanulate, subtruncate, striate, 4-5 mm. long; fruit oblong-ellipsoid, 3 cm. long, mucronate, with about 15-20 spirals of thin closely packed rhomboid scales 3. *macrocarpa*

1. *E. Hookeri* Wendl.—F.T.A. 8: 112, partly. *Calamus Hookeri* Maun & Wendl. in Trans. Linn. Soc. 24: 434, t. 41, fig. C. A climber about 100 ft. high.
S. Nigeria: mouth of the Niger (Aug.)! Also in the North-East Belgian Congo. Exsicc.—Mann 451. *Kalnbreyer* 65.
2. *E. Wendlandiana* Dammer ex Becc. in Webbia 3: 290. *E. Hookeri* C. H. Wright in F.T.A. 8: 112, partly, not of Wendl.
S. Nigeria: Barombi! Also in French Cameroons. Exsicc.—Preuss 460.
3. *E. macrocarpa* Wendl.—F.T.A. 8: 113. *E. Hookeri* A. Chev. Bot. 674, not of Wendl. *Calamus macrocarpus* Mann & Wendl. l.c. 435, t. 41, fig. B, and t. 43, fig. B. A climber 30 ft. high.
Sierra Leone: Bagroo River! Ivory Coast: Bingerville! Gold Coast: Juaso, in closed forest! S. Nigeria: Old Calabar (Feb.)! Agolo distr.! Exsicc.—Mann 2330. *Vigne* 1929. *Thomas* 338. *Chev.* 16208; 16209; 16209 bis.; 15406. (See Appendix).

8. *ONCOCALAMUS* Mann & Wendl.—F.T.A. 8: 110.

Leaves pinnate; leaflets about 5 pairs, opposite or subopposite, lanceolate, acute, about 10-15 cm. long and 2-4.5 cm. broad, remotely spinulose-dentate, thin, several-nerved; rhachis prickly on the margin near the base, produced into a slender cirrhus armed with reflexed opposite spines; basal sheath prickly 1. *Wrightiana*

Leaves bifurcate, the lobes up to about 50 cm. long and 10 cm. broad, many-nerved, more or less spinulose on the margin; rhachis produced into a long cirrhus armed with reflexed opposite or alternate spines; flowers not known 2. *acanthocnemis*

1. *O. Wrightiana* Hutch. in Kew Bull. 1936: ined. *O. Mannii* C. H. Wright in F.T.A. 8: 111, partly, not of Wendl. About 20 ft. high; fruits light yellow.
S. Nigeria: Lagos Island! Ebute Metta, swampy ground! Exsicc.—Barter 20220. *Millen* 18. *Carpenter* 422. (See Appendix).
2. *O. acanthocnemis* Drude—F.T.A. 8: 111.
S. Nigeria: Benin distr.! Uzuakoli! Also in Gabon and the Congo. Exsicc.—Imperial Institute specimen in Kew Herb. *Carpenter* 249.

9. *ANCISTROPHYLLUM* Mann & Wendl.—F.T.A. 8: 113.

Leaflets elongate-linear-lanceolate, about 25 cm. long and 2-3 cm. broad, with numerous fine subulate teeth on the margin; rhachis produced into a stout triangular cirrhus bearing several pairs of sharply triangular spines thickened at the base, also prickly towards the base; spadix with very numerous branches; bracts imbricate, pointed, glabrous; bracteoles cupular, truncate, about 6 mm. long; flowers abruptly apiculate; calyx campanulate, 4 mm. long; fruit broadly ellipsoid, sharply mucronate, about 2 cm. long, 1.2 cm. diam., covered by about 12 rows of closely packed rhomboid-ovate shining reflexed scales; seeds with a flat raphe 1. *secundiflorum*

As above, more or less, but flowers fusiform and acuminate; seeds with concave raphe 2. *acutiflorum*

Leaflets broadly elliptic-lanceolate, up to 30 cm. long and 9 cm. broad, entire or rarely with a few small subulate teeth on the margin; rhachis as above but with numerous very sharp smaller prickles; basal sheath very prickly; spadix with numerous rather short branches; bracts slightly imbricate; bracteoles pointed, striate; calyx 4 mm. long, lobes ovate-triangular; fruit subquadrately globose, about 1.8 cm. diam., with about 12 spirals of ovate-triangular scales obscurely furrowed down the middle 3. *opacum*

1. *A. secundiflorum* Wendl.—F.T.A. 8: 115; Chev. Bot. 675. *Calamus secundiflorus* Beauv. Fl. Owar. 1: 15, tt. 9-10. A tall climber up to about 100 ft. long; fruits red.
French Guinea: various localities! Sierra Leone. Ivory Coast: various localities! S. Nigeria: mouth of the Niger R. (Aug.)! Calabar! Barombi! Also in the Congo and Eastern Sudan. Exsicc.—Mann 453. *Barter* 61. *Smith* 53. (See Appendix).
2. *A. acutiflorum* Becc. in Webbia 3: 255 (1910).
S. Nigeria: Victoria to Bumba. Also in French Cameroons. Exsicc.—Preuss 1232.
3. *A. opacum* Drude—F.T.A. 8: 115. *A. laeve* A. Chev. Bot. 674. *Calamus opacus* Mann & Wendl. in Trans. Linn. Soc. 24: 431, t. 41, fig. D, and t. 43, fig. D. A climber; fruits red.
Ivory Coast: various localities! Gold Coast: Assin Yan Kumassi! Amentia! Simpa near Tarkwa! S. Nigeria: Barombi; Victoria! Fernando Po. Exsicc.—Chev. 16796; 17859; 19300; 22658. *Cummins* 229. *Vigne* 1875. *Kinloch* 14. *Mann* 97. *Maitland* 761. *Carpenter* 350. (See Appendix).

10. BORASSUS Linn.—F.T.A. 8 : 117 ; Beccari in Webbia 4 : 293-359 (1914).

A tall palm, the stem thicker above the middle, the younger part clothed by the persistent bases of the leaves ; leaves flabellately divided to about the middle, the lobes linear-lanceolate, soon splitting at the apex, about 3 cm. broad at the base ; transverse veins distinct, giving the lower surface a finely corrugated appearance ; petiole flat above, with jagged margins ; flowers dioecious ; male spadix branched from the base, branches poker-like, up to 2 m. long ; peduncle angular ; flowering part about 3 cm. diam. ; male calyx divided only to the middle ; female spadix up to 3 m. long ; fruit subglobose, enclosing 3 pyrenes ; pyrenes compressed-ellipsoid, about 10 cm. long, covered with fine fibres *aethiopum*

B. aethiopum Mart. in Münch. Gel. Anzeig. 1838 : 639, and 1839 : 46 ; Becc. in Webbia 4 : 325 (1914). *B. flabifolius* Linn. var. *aethiopum* Warb.—F.T.A. 8 : 117 ; Holl. 4 : 728.
In the drier parts of the area and widely distributed in other parts of tropical Africa ; also in Socotra and the Northern Transvaal. Beccari distinguishes two varieties on the shape of the pyrenes, var. *senegalensis* Becc., and var. *bagamojensis* Becc.

11. HYPHAENE Gaertn.—F.T.A. 8 : 118.

Leaves flabellate ; lobes linear-lanceolate ; petiole with numerous upwardly curved hooks ; male spadix 1-25 m. long ; male spathe-bracts encircling the spadix, pointed, emitting the male spadices, the latter with the stalk flattened next the spadix ; axils of male about 20 cm. long, 1 cm. thick ; bracteoles ribbed, glabrous ; branches of female spadix stouter, in the fruiting stage marked by densely tomentose cushions after the fall of the fruit ; fruit globose-quadrangular, about 6 cm. long and 5 cm. broad *thebaica*

H. thebaica Mart. Palm. 3 : 225, tt. 131-133 ; F.T.A. 8 : 120 ; Chev. Bot. 675, incl. var. *occidentalis* A. Chev. Mauritania : from Adrar to the Tagout ! French Sudan : Timbuctu (July) ! Gambia, on river banks ! Extends through the Shari to Egypt, Somaliland, Tanganyika and Arabia. (See Appendix).
I have not seen an authentic specimen of *H. guineensis* Sch. & Thonn., from the Gold Coast, which may belong here ; nor of *H. togoensis* Dammer, and *H. dahomensis* Becc., which at any rate are probably the same as *H. guineensis*.

176. PANDANACEAE

Trees or shrubs, trunk and branches often with aerial roots. Leaves in 4 rows or spirally arranged and crowded towards the top of the shoots, linear, sheathing at the base, keeled, mostly spinulose on the margins and keel. Flowers dioecious, paniculate or densely crowded into spadices, the latter axillary and terminal, fasciculate or paniculate, enclosed at first by spathaceous sometimes coloured or leafy bracts. Perianth rudimentary or absent. Male flowers : stamens numerous ; filaments free or connate ; anthers erect, basifixed, 2-celled, the cells sometimes again once divided. Female flower : staminodes absent or small and hypogynous or adnate to the base of the ovary. Ovary superior, 1-celled, free or confluent with adjacent ovaries into bundles with separate or united stigmas ; style very short or absent. Ovules solitary to many, basal or parietal. Syncarps oblong to globose ; mature carpels woody, drupaceous or baccate, pulpy inside. Seeds minute, with fleshy endosperm and minute embryo.

Tropics and subtropics, especially in oceanic islands.

PANDANUS Linn.—F.T.A. 8 : 127.

Ovaries with solitary ovules, free or connate into clusters ; placentas subbasal ; fruit woody or drupaceous ; staminodes absent from the female flowers.

A tree by water up to 10 m. high ; leaves broadly linear, gradually narrowed to the apex, up to 1 m. long, 2.5-5 cm. broad, very closely nerved, with numerous upwardly directed sharp teeth on the margin ; male inflorescences in the axils of large bracts, the lower bracts with leafy tops, the others thin and serrulate ; flowering axes up to 15 cm. long, flowers very numerous ; anthers about 2 mm. long ; infructescence oblong-ellipsoid, about 16-17 cm. long and 10 cm. diam. ; drupes angular at the top and bluntly pointed *candelabrum*

P. candelabrum Beauv. Fl. Owar. 1 : 37, tt. 21-22.—F.T.A. 8 : 132. *P. Heudelotianus* Balf. f. ; Chev. Bot. 676. *P. kamerunensis* Warb. *P. Barterianus* Rendle. *P. leonensis* Hort. *P. Unwinii* Martelli. *Heterostigma Heudelotianum* Gaud. *Tuckeya Candelabrum* Gaud.

Coastal districts from Senegal to S. Nigeria and Fernando Po, and probably further south. Exsicc.—Chev. 775 ; 802 ; 12433 ; 12450 ; 12868 ; 13539. *Sc. Elliot* 4504 ; 4918. *Mann* 780. *Thomas* 159 ; 7318. *Mildbr.* 10798. *Deitell* 108. *Beauvois*.

I have not been able to distinguish the species enumerated in the synonymy, to which should probably be added *P. togoensis* and *P. Kerstingii* Warb., inadequately described in Notizbl. Bot. Gart. Berl. Append. 22, 2 : 43 (1909).



FIG. 318.—*PANDANUS CANDELABRUM* Beauv. (PANDANACEAE).

A, flower. B, stamen. C, stigmas. (After Beauv.)

177. HYPOXIDACEAE

Herbs with a tuberous rhizome or a corm. Leaves mostly all radical, usually prominently nerved and often clothed with long hairs. Flowers solitary, spicate, racemose or subumbellate, mostly white or yellow, actinomorphic. Perianth-tube nothing or very short or consolidated into a long beak on top of the ovary; segments 6, spreading, equal. Stamens 6 or rarely 3, opposite the perianth-segments and inserted at their base; anthers 2-celled, opening lengthwise. Ovary inferior, 3-celled, style short or 3 styles separate. Ovules numerous in 2 series on axile placentas, or rarely few. Fruit a capsule opening by a circular slit or by vertical slits near the top, or indehiscent and fleshy. Seeds small; embryo in abundant endosperm.

Mainly Southern Hemisphere and tropical Asia.

Ovary immediately below the perianth-segments, the latter free to the base; fruit dehiscent by a circular split around the middle or into valves 1. *Hypoxis*
Ovary far below the perianth-segments which are separated from it by a long slender stipe-like tube; fruit indehiscent 2. *Curculigo*

1. *HYPOXIS* Linn.—F.T.A. 7: 377.

Leaves markedly recurved from the base to the apex, forming nearly a semicircle, up to 15 cm. long and 1 cm. broad, folded, each half about 6-nerved, glabrous; inflorescence 2-3-flowered, much shorter than the leaves; peduncle villous; bracts linear, about 1 cm long; pedicels about 1 cm. long; perianth-segments 1 cm. long, thinly villous outside. 1. *recurva*

Leaves straight or nearly so:

Leaves well over 0.8 cm. broad, up to 30 cm. long, villous on the margins, broadly sheathing at the base, about 3-nerved on each side of the midrib; peduncles as long as or shorter than the leaves, several-flowered; bracts linear-subulate, as long as the pedicels; perianth-segments oblong-lanceolate, villous with weak white hairs outside. 2. *urceolata*

Leaves about 0.5 cm. broad or less; perianth-segments up to 5 mm. in the opening flower:

Leaves elongated, 15-20 cm. long, linear, gradually very acute, about 0.5 cm. broad, very thinly pilose below and on the margin; peduncles very slender, 2-3-flowered, up to half as long as the leaves; bracts linear-filiform, 1 cm. long; pedicels filiform; perianth-segments linear-lanceolate, about 5 mm. long in the opening flower 3. *angustifolia*

Leaves shortly linear, 5-6 cm. long, thinly pilose:

Flowers solitary; perianth-segments lanceolate, 4 mm. long, with a tuft of yellow hairs at the apex, shortly pubescent outside 4. *camerooniana*

Flowers usually 2-3 to each peduncle; perianth-segments lanceolate, 4 mm. long, thinly pilose with long hairs all over the outside 5. *djalensis*

1. *Hypoxis recurva* Nel in Engl. Bot. Jahrb. 51: 325. *H. villosa* var. *foliis recurvis* Hk. f. *H. villosa* Baker—F.T.A. 7: 379, partly, not of Linn. f.
Cameroons Mt., about 7,000 ft. (Nov.-Jan.)! Buea. Grass area on the hills between Buea and Mann's Spring. Fakö Plateau, 7,000-8,000 ft. Exsicc.—Mann 1224; 2133. (See Appendix).

2. *H. urceolata* Nell.c. 336. A perennial herb with a large cylindrical corm, on grass plains, with racemes of yellow villous flowers.

N. Nigeria: Bauchi (Apr.-May)! Naraguta! Zelau, 3,200 ft. (Apr.)! Jos! Also in S. Sudan, Uganda, Kenya and Tanganyika. Exsicc.—Lely 14; 114; P. 202; P. 319. Hill 22.

3. *H. angustifolia* Lam.—F.T.A. 7: 378; Nell.c. 303. *Curculigo baguirmiensis* A. Chev. A grass-like herb with small bright yellow flowers.

Liberia: St. John's River. N. Nigeria: Top of Zaranda Mt., 5,800 ft. (May)! Widely distributed in tropical and South Africa, and in Mascarene Islands. Exsicc.—Lely 193.

4. *H. camerooniana* Baker—F.T.A. 7: 577; Nell.c. 302.

Cameroons Mt., grass meadows west of Buea! Also in French Cameroons, and Tanganyika (acc. to Nel l.c.). Exsicc.—Pruess 848.

5. *H. djalensis* Hutch. in Kew Bull. 1936: ined. *Curculigo djalensis* A. Chev. Bot. 635, name only. A very dwarf herb with a thick corm, 2-4 in. high; leaves up to 5 in. long, usually much shorter; flowers a little overtopping the shorter leaves.

French Guinea: Diaguisa, 4,000 ft. (Apr.)! Exsicc.—Chev. 12915; 12928 bis.

2. *CURCULIGO* Gaertn.—F.T.A. 7: 382.

Leaves tufted, elongate-linear-lanceolate, very acute, up to 50 cm. long and 3 cm. broad, thinly pilose with weak hairs; flowers solitary or paired; peduncle short and hidden in the leaf-sheaths; tube-like beak of the ovary linear, 5-8 cm. long, pilose with weak hairs; perianth-segments broadly lanceolate, 2 cm. long, thinly pilose; stamens on filaments half as long as the anther, the latter 7 mm. long; fruit oblong, sessile, crowned by the persistent tube of the perianth . . . *pilosa*

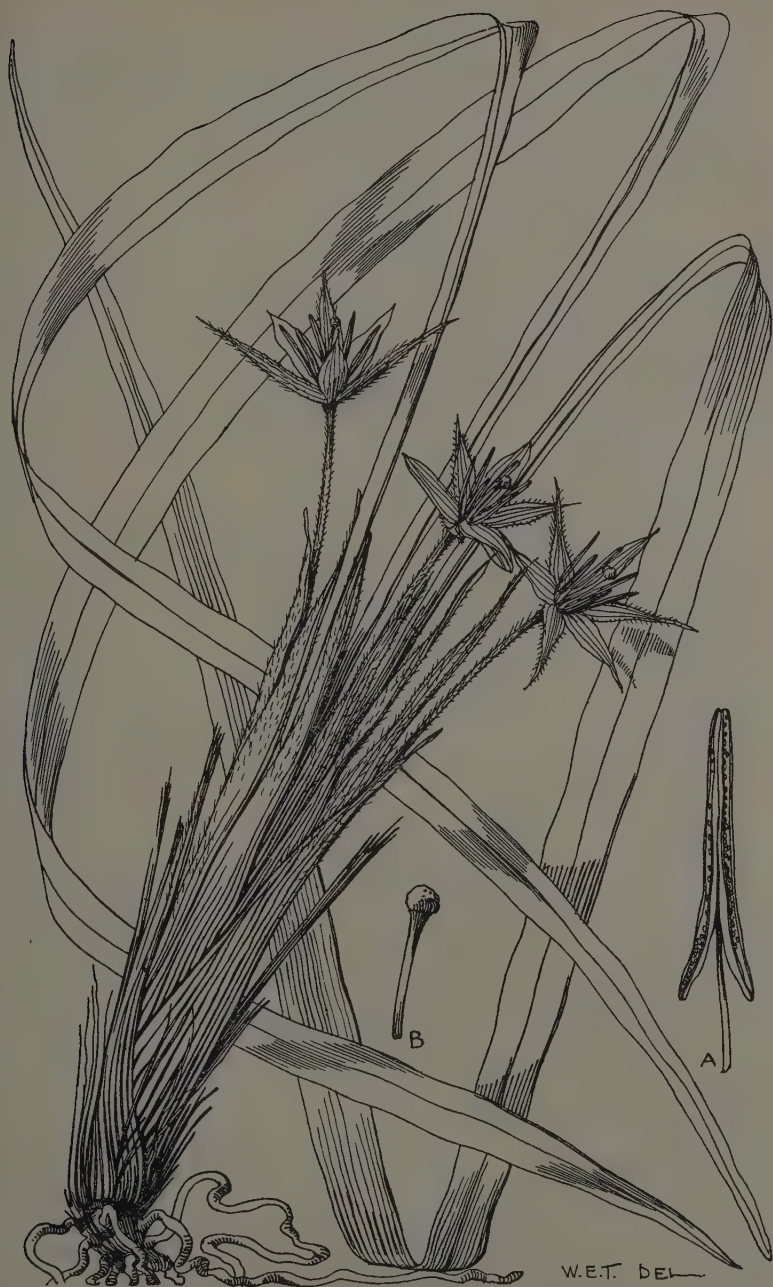


FIG. 319.—*CURCULIGO PILOSA* Engl. (HYPOXIDACEAE).
A, stamen. B, stigma.

C. pilosa Engl. in Engl. & Drude Veg. der Erde 9, 2: 353. *Gethyllis pilosa* Schum. & Thonn. *C. gallabatensis* Schweinf. ex Baker—F.T.A. 7: 383; Chev. Bot. 635. *Hypoxis villosa* A. Chev. Bot. 635, partly, not of Linn. f. Common in savannah country; flowers sessile, with a star-shaped crocus-yellow limb.
 French Sudan: between Diagara and Siensio (June)! French Guinea: Kouroussa! Gambia: in woodlands! Sierra Leone: Farana, in sandy alluvium, 3,300 ft. (Mar.)! Ivory Coast: Mankono (July)! Gold Coast: Zuregu, Northern Territ. (Apr.)! Salaga! near Kintapa (Mar.)! Afram Plains (Mar.)! Togo: Bismarkburg! N. Nigeria: Zunguru (May)! Nupe! Zaria (June)! Liruwen-Kafo Hills! S. Nigeria: Ilorin! Oghoro (May)! Expands to the Nile districts, Nyasaland and Angola. Exsicc.—Hayes 540A. Sc. Elliot 5374. Bunting 7. Lloyd Williams 143. Dalz. 76; 272. Johnson 701. Barter 1506. Lamb 59. Chev. 1019; 15638; 21988. (See Appendix).

178. TACCACEAE

Perennial herbs with a tuberous or creeping rhizome. Leaves all radical, large, entire or much lobed. Flowers actinomorphic, hermaphrodite, umbellate; bracts forming an involucre, the inner often thread-like. Perianth with a short tube and 6 lobes, lobes 2-seriate, mostly somewhat corolline. Stamens 6, inserted on the perianth; filaments short; anthers 2-celled, opening lengthwise. Ovary inferior, 1-celled, with 3 parietal placentas; style short, the 3 stigmas often petaloid and reflexed over the style; ovules numerous. Fruit a berry or rarely opening by valves. Seeds numerous, with copious endosperm and minute embryo.

Tropical regions and China.

TACCA Forst.—F.T.A. 7: 413.—Characters of the family; fruit a berry.

Leaves erect, shining, 3-partite, each segment 2-forked, pinnatipartite, the lower lobes separated, the upper ones connected, sometimes one segment not 2-forked, glabrous; peduncle long and rather slender; involucre bracts about 6, obovate-spathulate, strongly nerved outside, 3-4 cm. long, acuminate and sometimes lobed at the apex; innermost bracts long and thread-like; fruit ovoid-ellipsoid, about 3-5 cm. long; seeds ribbed *involucrata*

T. involucrata Schum. & Thonn. Beskr. Pl. Guin. 177; Limpricht in Engl. Pflanzenr. Taccac. 29; Chev. Bot. 638. *T. pinnatifida* Baker—F.T.A. 7: 413; Chev. Bot. 638, not of Forst. Root tuberous; flowers green, with purplish thread-like inner bracts.

French Sudan! Senegal! French Guinea! Sierra Leone: Musaia! Ivory Coast! Gold Coast: Nkoranza, North Ashanti (Apr.)! Accra (June)! Dahomey! N. Nigeria: Nupe! Bauchi Plateau! Katagum! Zungeru! Nabardo! S. Nigeria: Lagos Colony! Extends to Abyssinia and south to Nyasaland and to Gabon; also in the Mascarene Islands. Exsicc.—Thomas 2654. Irvine 916. Johnson! Barter 1541. Lely 209; P. 315. Dalz. 238; 262. Chev. 933, etc. (See Appendix).

179. BURMANNIACEAE

Slender and sometimes very delicate annual or perennial saprophytic herbs with or without leaves, the latter mostly reduced to scales. Flowers mostly blue or white, rarely yellow, solitary or racemose or in a bifurcate cyme. Perianth corolla-like, tubular, usually 6-lobed; tube sometimes 3-winged or angled, outer lobes valvate, inner smaller or absent. Stamens 3, sessile or subsessile and opposite the inner lobes; anthers 2-celled, dehiscing transversely, the connective broad. Ovary inferior, 3-celled with axile placentas or 1-celled with parietal placentas; style shortly 3-lobed. Ovules very numerous, minute. Fruit a capsule, often 3-winged, usually opening by longitudinal slits between the placentas. Seeds numerous, small, with scanty endosperm.

Tropics and subtropics.

Perianth-tube and ovary not winged; ovary 1-celled, with parietal placentas

1. *Gymnosiphon*

Perianth-tube and ovary 3-winged; ovary 3-celled, with axile placentas

2. *Burmanna*

1. *GYMNOSIPHON* Blume—F.T.A. 7: 11.

Cymes laxly bifurcate, with scattered flowers; stems with few minute bract-like leaves; pedicels slender, about 4 mm. long; perianth-tube urceolate, 4 mm. long, shortly 3-lobed; fruit subglobose, capped by the persistent perianth 1. *longistylus*
 Cymes dense and head-like, with crowded flowers; stems with numerous bract-like narrowly ovate leaves about 5-6 mm. long; perianth-tube narrow, about 6 mm. long, with 3 lanceolate lobes about one-third as long 2. *congestus*



FIG. 320.—*TACCA INVOLUCRATA* Schum. & Thonn. (TACCACEAE).
A, flower-bud. B, pistil. C, cross-section of ovary.

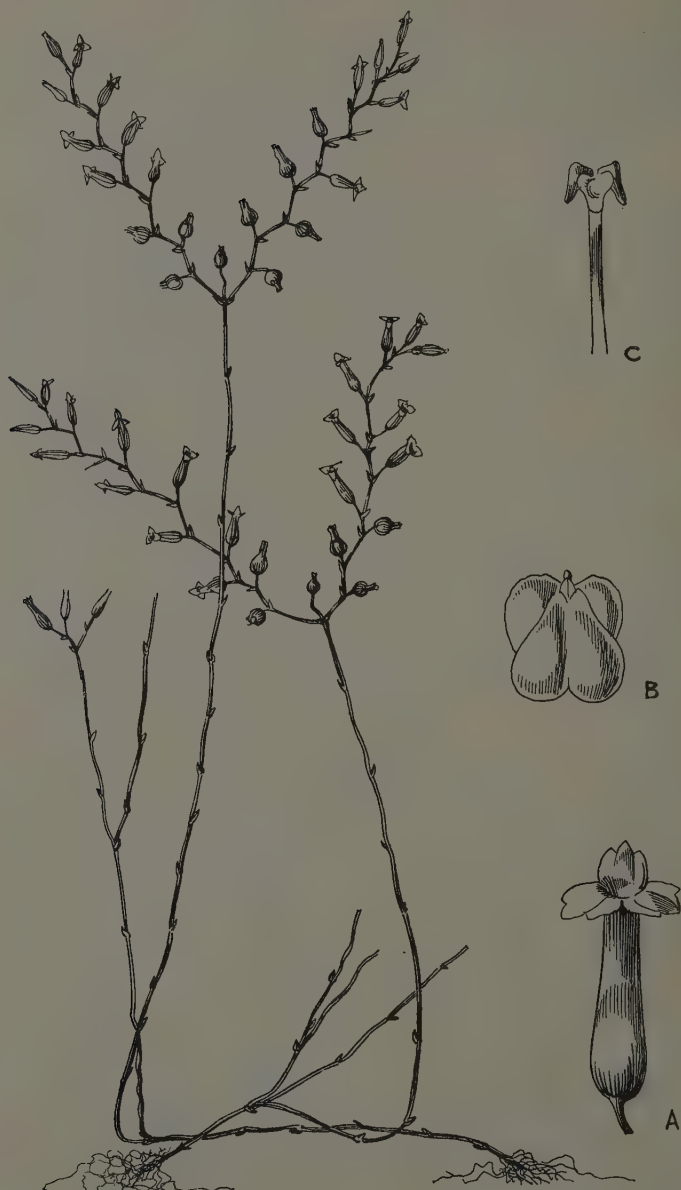


FIG. 321.—*GYMNOSIPHON LONGISTYLUS* Hutch. (BURMANNIACEAE).

A, flower. B, stamens. C, style and stigmas.

1. *G. longistylus* Hutch. in Kew Bull. 1936: ined. *Dictyostegia longistyla* Benth. *G. squamatus* C. H. Wright. Saprophytic on the roots of trees, etc., stems very slender.
Gold Coast: Anhasa forest reserve (Dec.)! S. Nigeria: Nun River (Aug.-Sept.)! Lagos, in damp forest at Apapa, amongst rotting oil-palms (Jan.)! Annue (Sept.)! Oban! Extends to Gabon. Exsicc.—*Mann* 515, partly. *Vogel* 37. *Dalz.* 1277. *Unwin* 144. *Talb.* 715. *Linder* 292; 357; 1217. *Vigne* 3216.
2. *G. congestus* C. H. Wright—F.T.A. 7: 12. Stems fairly stout and with numerous leaves about their own length apart.
Liberia: Banga (Oct.)! S. Nigeria: Nun River (Sept.)! Also in French Cameroons. Exsicc.—*Mann* 515, partly. *Linder* 1216.

2. BURMANNIA Linn.—F.T.A. 7: 11.

Leaves few towards the base of the stem, lanceolate, acute, glabrous, thin; stems slender and wiry, up to 30 cm. long, with a much reduced leaf here and there; inflorescence 1-several-flowered; bracts lanceolate, acuminate, 3 mm. long; perianth-tube and ovary broadly 3-winged, wings becoming violet, at length forming an obovate outline when flattened out; ovary 3-celled; anthers 3, subsessile *bicolor*

- B. bicolor* Mart. Nov. Gen. et Sp. 1: 10, t. 5. *B. bicolor* var. *africana* Ridl.—F.T.A. 7: 11. *B. inaequalata* Engl. *B. liberica* Engl. *B. Caillei* A. Chev. Bot. 613, name only. *B. latialata* Pobég. Erect, 3-9 in. high, with mauve wings on the ovary and perianth, and yellow stamens.
Senegal: Casamance (Feb.)! French Guinea: Grand Chutes (Dec.)! Bouria (Nov.)! Sierra Leone: Kanya (Oct.)! Between Juring and Blama (Dec.)! Hills near Bumban, wet places in short grass on granite (Aug.)! Liberia: Ivory Coast: Upper Sassandra; top of Mt. Don, 4,000 ft.! N. Nigeria: Kontagora (Dec.)! Mada Hills! Extends to Nyasaland and Angola, and in S. America. Exsicc.—*Farrar* 200. *Thomas* 2979. *Deighton* 298; 1305. *Dalz.* 263. *Hepburn* 85. *Cuille* in Herb. Chev. 14704. Chev. 2558; 20219; 20323. *Fleury*. *Dinklage* 2028. *Linder* 31; 1491.

180. THISMIACEAE¹

Small fleshy saprophytic herbs; leaves reduced to scales. Flowers fairly large, solitary, terminal, or few and axillary, actinomorphic. Perianth corolla-

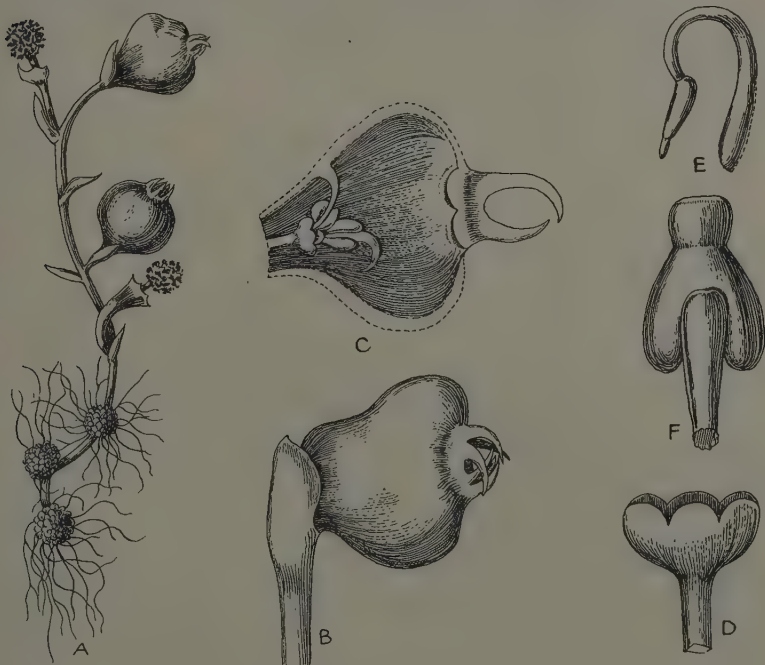


FIG. 322.—*AFROTHISMIA PACHYANTHA* Schlechter (THISMIACEAE).

A, habit. B, flower. C, vertical section through same. D, style. E and F, stamens.
(After Schlechter.)

like, inflated, tubular or campanulate, open or constricted at the mouth; lobes 6 or 3, all with long filiform appendages or three of them broad and suborbicular.

¹ See Hutchinson, *Families of Flowering Plants*, 2: 177 (1934).

Stamens 6 or 3; anthers 2-celled, cells separated by a broad membranous connective. Ovary inferior, 1-celled, with 3 parietal placentas which soon break away from the cell-wall and become suspended; style mostly short, with 3 stigmas; ovules numerous on each placenta. Fruit a circumscissile capsule. Seeds numerous, small, without endosperm.

Tropics, Tasmania, New Zealand and N. America.

Stamens 6; perianth zygomorphic, with 6 incurved unequal lobes 1. *Afrothismia*
Stamens 3; perianth actinomorphic, with 6 erect lobes 2. *Oxygyne*

1. **AFROTHISMIA** Schlechter in Engl. Bot. Jahrb. 38: 138, fig. 1, A-F (1906).—Specimens of this and the next genus have not been seen; descriptions compiled from Schlechter in Notizbl. Bot. Gart. Berl. 8: 31-45 (1921).

Perianth narrowly urceolate, the lobes on each side at the base with a reflexed tooth, the tube within and about the middle furnished with a slightly lobulate annulus

Perianth broadly incurved-obovoid, lobes not dentate at the base, the tube lobulate within the mouth 1. *Winkleri*
.. .. 2. *pachyantha*

1. A. *Winkleri* Schlechter l.c. 139. *Thismia Winkleri* Engl. Bot. Jahrb. 38: 89, with fig. Tiny saprophyte about 1½ in. high, the rhizome bearing several subglobose bodies emitting thread-like filaments. Cameroons Mt.: Neu-Tegel, near Victoria (July). Moliwe (Sept.). Also in French Cameroons. Exsicc.—Winkler 225. Schlechter 15788.

2. A. *pachyantha* Schlechter l.c., fig. 1, A-F. Tiny saprophyte up to 1½ in. high; perianth about ¼ in. long. Cameroons Mt.: forest at Moliwe (Sept.). Exsicc.—Schlechter 15789.

2. **OXYGYNE** Schlechter in Engl. Bot. Jahrb. 38: 140 (1906).

A tiny saprophyte about 4 cm. high; stem 1-flowered, covered with several scales; bract similar to the upper scales, rounded; flower erect, about 2.2 cm. long; perianth narrowly campanulate, tube about 1 cm. long, lobes broadly triangular-acuminate, narrowly caudate-acuminate *triandra*

O. *triandra* Schlechter l.c., fig. 1, G-M. Cameroons Mt.: forest at Moliwe (Sept.). Exsicc.—Schlechter 15790.

181. ORCHIDACEAE

By V. S. SUMMERHAYES

Perennial, terrestrial, epiphytic or saprophytic herbs with rhizomes or tuberous roots or rootstock; stem leafy or scapose, frequently thickened at the base into pseudobulbs and bearing aerial assimilating roots. Leaves undivided, alternate and often distichous, rarely opposite, sometimes all reduced to scales, often fleshy, sheathing at the base. Flowers bracteate, hermaphrodite or very rarely polygamous or monoecious, zygomorphic; inflorescence spicate, racemose or paniculate, or flowers solitary. Perianth epigynous, composed of 6 petaloid segments in 2 whorls, or the outer whorl calyx-like and the inner corolla-like, or the outer rarely corolla-like and the inner minute, free or variously connate in each whorl; outer segments ("sepals") imbricate or subvalvate, the middle segments of each whorl generally different in size and colour from the lateral ones, especially the middle "petal" which is often extremely complicated in structure and is termed the lip or *labellum*; on account of the twisting of the ovary through 180°, the *labellum* is often placed in an abaxial position; frequently the *labellum* or more rarely the odd sepal is prolonged into a sac or spur, sometimes very long. Stamens 2 or 1; anther or anthers 2-locular, introrse, opening by a slit lengthwise; pollen granular or generally agglutinated into mealy, waxy or bony masses (*pollinia*); at one end the pollinium may be extended into a sterile portion (*caudicle*); the *pollinia* may be free in the anther-loculi or more or less loosely united. Ovary inferior, 1-locular with 3 parietal placentas or very rarely 3-locular with axile placentas, usually produced at the apex into a special structure (*column*); stigmas 3 fertile, or more frequently the lateral 2 fertile, the other sterile and transformed into a small outgrowth (*rostellum*) which lies between the anther and the stigmas; a portion of the *rostellum* is sometimes modified into a viscid disk or disks (*viscidia*) to which the *pollinia* are attached. Ovules very numerous and minute. Fruit usually a

capsule, mostly opening laterally by 3 or 6 longitudinal slits. Seeds very numerous, minute, often drawn out at each end, or rarely winged, without endosperm; embryo not differentiated.

Widely distributed, most numerous and of very diverse form in the Tropics; main centres of distribution Indo-Malaya and Tropical America.

*Key to the Genera*¹

*Anther attached to the column by its base, thecae adnate to the column and persistent; pollinia granular, with caudicles and 2 (or rarely 1) viscidia; mostly terrestrial with erect annual leafy stem and terminal inflorescence, a few epiphytic or saprophytic:

Lip with 1 or 2 distinct but sometimes rather short spurs:

Spurs 2; labellum at top of flowers (flowers not resupinate); sepals and petals similar, more or less united to one another and to the lip; column slender, somewhat curved; stigma superior, cushion-like, fleshy; anther pendulous

12. *Satyrion*

Spur 1:

Lip more or less united to the column; leaves radical, orbicular:

Scape without any sheathing scales; lip adnate to column at base only; leaves 2

1. *Holothrix*

Scape with numerous sheathing scales; lip adnate to column for some distance; leaf 1, withering at or before time of flowering 2. *Deroemera*

Lip quite free from the column:

Stigmas sessile; stems leafy all the way up; bracts leaf-like:

Lip with 2 upright keels continuous with the base of the column, 3-lobed; viscidia partly included in pouch-like developments of the rostellum

5. *Diplacorchis*

Lip without any keels, obcordately 2-lobed from a narrow claw; viscidia naked

6. *Phyllomphax*

Stigmas borne on or forming club-shaped processes, projecting from the front of the column, free or partly united to the lateral lobes of the rostellum:

Stigmatic processes partly united to the lateral lobes of the rostellum; ovary frequently glandular pubescent 7. *Cynorchis*

Stigmatic processes free from the rostellum:

Middle lobe of rostellum concave, frequently placed some way in front of the anther; lip entire or with a small tooth-like lobe on each side at the base; petals entire or with a small lobe at the base, more or less falcate; dorsal sepal large, convex, laterals sharply deflexed; inflorescence few-flowered

9. *Platycoryne*

Middle lobe of rostellum usually flat or subulate, more or less adpressed to the anther; other characters not associated as in last 8. *Habenaria*

Lip sometimes concave at the base but with no distinct spur:

Dorsal sepal drawn out into an erect or pendulous spur; lip entire with short tooth-like lateral lobes; rostellum small, tooth-like:

Petals free from dorsal sepal; anther erect or horizontal 10. *Disa*

Petals united to dorsal sepal; anther horizontal 11. *Brownleea*

Dorsal sepal without a spur:

Rostellum large, more or less orbicular, forming a shield-like process covering the anther; lip united to the column at the base; dorsal sepal and petals united to form a variously shaped hood; lateral sepals each with a small spur-like sac near the inner margin 13. *Disperis*

Rostellum rather small, cucullate, shorter than the anther; lip free from the column; dorsal sepal and petals free:

Tall leafy plants; inflorescence usually many-flowered 4. *Brachycorythis*

Dwarf leafless plants; inflorescence up to 4-flowered 3. *Schwartzkopfia*

**Anther attached to the column by its apex (usually at the back of the column), either operculate (i.e. the anther can be lifted like a little cap, the pollinia usually being carried with it) or erect and persistent, the caudicle and viscidium being then at the top:

†Pollinia granular or much divided into small masses attached to a common axis:

Tall climbers with fleshy green stems and usually with leaves; flowers in short axillary racemes, rather large (perianth at least 2 cm. long); lip more or less united to the long curved column, disk bearing either scales or lines of hairs

14. *Vanilla*

Terrestrial erect or rarely somewhat decumbent herbs with usually terminal but rarely lateral inflorescences:

¹ It should be pointed out that this key is drawn up mainly from the West African species, and some of the minor characters used may therefore not apply to species from other areas.

No leaves at time of flowering or saprophytic and non-chlorophyllose ; flowering stems arising from underground tuber ; rostellum short or minute :

Lip with a distinct spur ; saprophytic 16. *Epipogium*

Lip without a spur :

Slender saprophytic plant with short raceme of small flowers (less than 1 cm. long in W. African species) ; lip simple with a slender claw ; petals and sepals united to one another in the lower part 17. *Auxopus*

Flowers appearing on leafless scapes before the leaves ; leaf solitary, reniform or ovate with a long petiole ; flowers over 1 cm. long, usually few ; lip more or less trilobed, bearing either numerous hairs or 2 distinct keels ; petals and sepals free 15. *Nervilia*

Leafy plants usually with slender creeping rhizome or fibrous rootstock ; rostellum elongate :

Stems 3-6 ft. high, rigid, leafy ; leaves plicate, lanceolate or narrowly elliptical, lamina 15-30 cm. long ; inflorescences axillary or terminal, paniculate ; perianth segments over 5 cm. long, linear ; lip very like other segments but broadly ovate at apex 23. *Corymborchis*

Stems less than 3 ft. high including inflorescence, not very rigid, often decumbent at the base ; leaves soft and thin, frequently with a long petiole, lamina less than 20 cm. long, usually much shorter ; flowers less than 1 cm. long :

Lateral sepals united to one another and to the petals for at least half their length ; column with 2 terminal appendages :

Stem elongated, decumbent below, erect and leafy at apex ; lip free from the sepals, with a spreading limb, narrow claw and concave base ; appendages of column entire 20. *Cheirostylis*

Stem very short with a bunch of radical leaves ; lip united to the sepals, at the base of the free part provided with 2 small reflexed marginal appendages ; appendages of column serrate 18. *Manniella*

Lateral sepals free or only united at the very base :

Column much longer than broad ; arms of rostellum long, subulate, acute

19. *Platylepis*

Column short, nearly as broad as long ; arms of rostellum short and acute, or if larger linear-spathulate, obtuse :

Column with 2 usually parallel longitudinally placed keels on the front ; flowers usually not resupinate 22. *Hetaeria*

Column without keels on the front ; flowers resupinate 21. *Zeuxina*

††Pollinia waxy, entire, 2, 4 or 8, either free, or adhering at one end by viscid outgrowths (the caudicles), or attached to 1 or 2 sticky gland-like structures (the viscidia) ; anther operculate :

‡Growth sympodial, consisting either of annual growths from a tuberous underground root or stem, or of a series of erect or creeping lateral shoots, the stem in each growth being often partly thickened to form a fleshy pseudobulb ; inflorescence terminal on the year's growth, or axillary :

Pollinia 8, united at the base by a sticky appendage ; leaves plicate ;

Lip with a distinct spur, adnate to the column ; column short ; inflorescence tall, many-flowered, apparently terminal on the leafy shoot 28. *Calanthe*

Lip without a spur, not adnate to the column ; column long and slender ; inflorescence short, few-flowered, arising from the base of the leafy pseudobulb 29. *Ancistrochilus*

Pollinia 2 or 4, in the latter case sometimes united in pairs :

Anther 2-locular ; pollinia free or joined together by a sticky appendage, neither attached to the rostellum nor possessing a distinct viscidium :

Column not produced downwards into a foot ; lip continuous with the base of the column ; inflorescence terminal on the annual leafy growths ; pseudobulbs not well defined and often absent :

Anther attached at the back below the apex of the column ; rostellum terminal ; column short ; sympodial growths forming a slender creeping rhizome, the erect stems being distant from one another ; pseudobulbs absent ; leaves some way from the base of the stem 24. *Malaxis*

Anther attached at the apex of the column ; rostellum subterminal ; column rather long, often curved ; sympodial growths usually closely placed, often pseudobulbous ; leaves usually near the base of the stem 25. *Liparis*

Column usually short, produced downwards into a foot often nearly as long as itself ; lip articulated on the column-foot and freely moving ; inflorescences arising from the base of the pseudobulbs ; pseudobulbs well defined, bearing 1-2 (rarely 3) leaves at the apex 30. *Bulbophyllum*

Anther incompletely 2-locular ; pollinia attached by a stalk (stipes) to the viscidium (both stipes and viscidium are part of the rostellum), which comes away with them :

Flowers not resupinate (lip uppermost) ; mostly epiphytic or on rocks :

Inflorescence terminal on the leafy shoots ; petals easily visible

Inflorescence axillary from the base of the distantly placed pseudobulbs ; petals minute 27. *Polystachya*
 31. *Genyorchis*

Flowers resupinate (dorsal sepal uppermost) ; mostly terrestrial, a few epiphytic :

Lip without a spur ; epiphytic ; pseudobulbs tall, fusiform, many-leaved ; inflorescence paniculate ; sepals and petals similar 26. *Ansellia*

Lip with a distinct spur or very concave sac at the base :

Epiphytic ; rostellum long, beak-like ; inflorescence paniculate 34. *Eulophiopsis*

Terrestrial, or very rarely epiphytic ; rostellum very short and broad :

Pseudobulbs 1-leaved ; leaves fleshy, conduplicate 32. *Eulophidium*

Pseudobulbs 2- or more-leaved, or with tuberous underground stem ; leaves plicate, very frequently not developed at time of flowering 33. *Eulophia*

†† Growth monopodial, continued by a relatively slow-growing apical bud ; no pseudobulbs ; leaves when present more or less distichous, fleshy, conduplicate, very frequently unequally bilobed at the apex ; inflorescences always axillary ; pollinia with stipes and viscidium ; nearly all epiphytic :

Leaves absent ; roots very abundant, assimilating 41. *Microcoelia*
 Leaves present :

Rostellum not elongated, so deeply cleft that the apex of the column appears to be bifid in front ; lip usually very concave, entire, the base more or less enveloping the column, frequently with a central longitudinal keel ; mouth of spur wide, the disk of the lip gradually passing into the spur 39. *Angraecum*

Rostellum elongated, easily distinguishable, often deeply bifid, sometimes with an additional central lobe :

Lip with a small tooth-like or rim-like callus in the centre at the mouth of the spur ; mouth of spur narrow ; pollinia with separate stipes and common viscidium or each with its own stipes and viscidium 42. *Diaphanante*

Lip without any tooth-like callus :

Column long and slender, terete below the stigma, 3.5-4 cm. long ; perianth-segments all very similar, the lip broader than the others ; spur over 15 cm. long 48. *Barombia*

Column usually rather thick, 1 cm. or less in length, rarely terete ; spur very rarely over 15 cm. long, usually much shorter :

¶ Pollinia on a single stipes and viscidium, the stipes very rarely bilobed in the upper part and bearing one pollinium on each lobe :

Stipes of pollinia elliptical, somewhat constricted below the middle, the apex running down into a deep depression at the back of the androclinium, the pollinia attached near the centre of the ovate upper part ; viscidium rectangular, attached to the anticus margin of the stipes ; lip trilobed ; stem long ; inflorescences several-flowered 51. *Dinklageella*

Stipes of pollinia linear or somewhat widened in the upper part, the pollinia attached near or at the apex :

Rostellum produced downwards and then sharply reflexed parallel to itself so that the apex points upwards, bipartite almost from the base ; stipes somewhat shortly bifid at the apex ; viscidium long and narrow, attached to nearly the whole length of the rostellum ; inflorescences short and dense-flowered, arising at the base of the plant in the axils of the oldest leaves or leaf-bases 54. *Ancistrorrhynchus*

Rostellum not sharply recurved upwards ; viscidium about as broad as long or broader :

Stems elongated, bearing leaves at more or less regular intervals usually for the greater part of their length :

Spur with a narrow mouth, easily distinguishable from the limb of the lip, almost straight, not or only slightly thickened in the apical part ; lip frequently 3-lobed, the side-lobes sometimes tooth-like, in some species with thickened auricles on each side of the mouth of the spur 56. *Tridactyle*

Spur with a wide mouth, gradually merging into the limb of the lip, narrowest in the middle and swollen at the apex :

Spur abruptly recurved near the apex, about as long as the rest of the lip ; lip usually distinctly 3-lobed ; perianth-segments acuminate 38. *Calyptrochilum*

Spur straight or very gently curved, much longer than the rest of the lip ; lip indistinctly 3-lobed or entire ; perianth-segments obtuse 50. *Solenangis*

Stems short, bearing all the leaves closely together :

Spur with a narrow mouth, easily distinguishable from the limb of the lip,

- usually much longer than the rest of the lip and not or scarcely thickened in the apical part; lip acute, very similar in shape to the other perianth-members 47. *Aerangis*
- Spur with a wide mouth, gradually merging into the limb of the lip, about the same length as the rest of the lip, distinctly thickened and recurved in the apical part; lip obtuse, obscurely trilobed, much broader than the other perianth-segments 52. *Eurychone*
- ¶¶ Pollinia with separate stipites and either a common viscidium or 2 separate viscidia:
- Leaves Iris-like, radiating like a fan from a common point, the 2 surfaces facing sideways, quite entire at the apex, closely imbricate at the base, fleshy; pollinia with a common viscidium:
- Inflorescences much shorter than the leaves, rather dense flowered, flowers with long pedicels; spur much longer than the limb of the lip, swollen at the apex, nearly straight; lip entire 37. *Podangis*
- Inflorescences about as long as, or longer than, the leaves, sometimes a little shorter; spur not swollen towards the apex:
- Flowers with long pedicels; sepals over 6 mm. long; lip entire, ovate or lanceolate; spur longer than the limb of the lip, incurved at the apex only 36. *Rangaeris*
- Flowers with very short pedicels; sepals less than 4 mm. long; lip with rounded side-lobes and acute middle-lobe; spur equal to or shorter than the limb of the lip, sharply curved forward under the lip 44. *Bolusiella*
- Leaves not Iris-like, the surfaces usually placed horizontally and frequently much reflexed, or if vertically placed the apices more or less unequally bilobed:
- Flowers in very dense almost spherical subsessile inflorescences at the base of the leaves; bracts large, as long as the flowers; rostellum produced downwards and then recurved sharply parallel to itself, deeply bifid; viscidium elongated, attached to nearly the whole length of the rostellum 53. *Cephalangraecum*
- Flowers in long and usually relatively lax inflorescences; bracts much shorter than the flowers; rostellum never as above:
- Rostellum long and beak-like, longer than the short column, bifid for two-thirds of its length; viscidium elongated, either linear or with a broad rolled-up portion to which the stipites are attached and a narrow hyaline portion adnate to the apical part of the rostellum; lip similar to perianth-segments, all narrow and acuminate; spur somewhat widened towards the mouth, at least twice as long as the lip 49. *Cyrtorchis*
- Rostellum shorter than the column; viscidium as broad as long or rarely shortly rectangular:
- Lip deeply 3-lobed, the lateral lobes narrow and spreading; petals more or less deltoid, the anticus margin rounded and projecting a long way forward 55. *Angraecopsis*
- Lip entire, very shortly 3-lobed at the apex only, or rarely with almost orbicular side lobes at the base:
- Mouth of spur some distance from base of lip, base of column and attachment of lateral sepals; inflorescence erect, very dense; flowers small; leaves with parallel margins, closely imbricate at the base; viscidium common 40. *Listrostachys*
- Mouth of spur immediately below base of column or attachment of lateral sepals:
- Viscidium 1, common to 2 pollinia and stipites:
- Spur swollen at the apex; flowers small (sepals 3-6 mm. long), sometimes opposite 45. *Chamaeangis*
- Spur tapering towards the apex, often much longer than the lip; flowers rather small (sepals 7 mm. long) to large:
- Lip indistinctly 3-lobed at the apex, lateral lobes rounded, somewhat toothed, middle lobe much longer, acuminate, at the base of the lip a toothed projection on each side of the mouth of the spur; rostellum long, subulate; viscidium small, rounded 46. *Leptocentrum*
- Lip quite entire, with no toothed projection on the sides at the base, rarely 3-lobed with almost orbicular side lobes; rostellum shorter, usually bifid or trifid 36. *Rangaeris*
- Viscidia 2, each with pollinium and stipes:
- Lip indistinctly 2-3-lobed, obtuse; sepals and petals obtuse:
- Lip much longer than broad, distinctly constricted in the middle; petals oblong 43. *Sarcorrhynchus*

Lip usually broader than long; petals nearly orbicular

35. *Rhipidoglossum*

Lip quite entire, acute; sepals and petals acute or acuminate

36. *Rangaeris*1. *HOLOTHRIX* Rich.—F.T.A. 7: 190.

Terrestrial; leaves 2, basal, orbicular, 1-1.5 cm. long, upper smaller; scape 6-16 cm. long, densely and retrorsely pubescent, without sheaths; flowers in a short spike, white tinged with mauve; sepals and petals 3-toothed at the apex; lip 7-toothed

tridentata

H. tridentata Robb. f.—F.T.A. 7: 193. *H. platydictyla* Kraenzl.—A dwarf herb up to 5 in. high with 2 basal flattened leaves and mauve-white flowers.

Cameroons Mt., 7,000-11,000 ft. (Oct.-Nov.)! Exsicc.—Mann 2123. Preuss 1036. Johnston.

2. *DEROEMERA* Rehb. f.—F.T.A. 7: 195.

Terrestrial; leaf radical, solitary, orbicular, withering just before or at flowering time; scape erect, up to 18 cm. high, with a hyaline sheath at the base, covered in the lower portion with lanceolate acuminate scales 0.5-1 cm. long, racemously 10-30-flowered; flowers somewhat secund, white or very pale bluish; petals oblong, triapiculate, middle lobe longest, 5 mm. long; lip elliptical, 4-5 mm. long, 3-lobed, side lobes rounded, middle lobe narrow, acute

Ledermannii

D. Ledermannii Schltr. in Engl. Bot. Jahrb. 53: 486, in obs. *D. calva* Schltr. l.c. *Holothrix Ledermannii* Kraenzl. *H. calva* Kraenzl.

S. Nigeria: Kumbo, 4,000 ft. (Dec.)! Kufum, 6,700 ft. (Dec.)! Bamenda, 8,000 ft. (Jan.)! Exsicc.—Ledermann 1988; 2005. Migod 327.

3. *SCHWARTZKOPFFIA* Kraenzl. in Engl. Bot. Jahrb. 28: 177.

Terrestrial, probably saprophytic; leaves absent; scape up to 9 cm. high, glabrous, covered with large overlapping acute sheaths; flowers 2-3, subcapitate, lilac; lip nearly equally 3-lobed, with a sac-like base surrounded by 2 wing-like calli running down from the column and uniting in front, disk naked

Pumilio

S. Pumilio Schltr., Die Orchideen, 63. *S. Buettneriana* Kraenzl. *Brachycorythis Pumilio* Rehb. f.—F.T.A. 7: 203. *B. rosea* Chev. Bot. 621.

Sierra Leone: Bagroo R. (April)! Jephun (Jan.)! South Kambui Hills (March)! Liberia: Jui, Gola Forest (April)! Ivory Coast: Middle Cavally River, between Fort Binger and Mt. Niènkoué (July)! Togo: Bismarckburg! Exsicc.—Mann 904. Smythe 220. Büttner 40. Dawe 452. Chev. 19502.

4. *BRACHYCORYTHIS* Lindl.—F.T.A. 7: 34.

Leaves softly velvety; flowers small, lip 5-7 mm. long, trilobed; lobes rounded-triangular, side lobes slightly longer than the middle lobe

1. sudanica

Leaves quite glabrous; flowers larger, lip over 9 mm. long:

Lip almost entire with a small tooth at the apex, about 9 mm. long, scarcely longer than the sepals

2. sceptrum

Lip distinctly 3-lobed, the middle much shorter than the side lobes, considerably longer than the sepals:

Plant usually 40-90 cm. high, terrestrial; flowers numerous in a long spike; bracts narrowly lanceolate; lip 1-2 cm. long

3. Schweinfurthii

Plant usually 20-40 cm. high, frequently epiphytic; flowers up to 25 in a relatively short spike; bracts broadly or oblong-lanceolate; lip 2-3 cm. long

4. Kalbreyeri

1. *B. sudanica* Schltr. in Beih. Bot. Centralbl. 38, II: 111. A slender herb 18-30 in. high with pink, bluish or reddish-purple flowers.

French Sudan: Folo (May)! French Guinea: Sabodougou, near Touba (July)! Togo: Bassari. Fasugu (May). N. Nigeria: Vom! Zungeru (July)! Naraguta (May)! Lokoja! S. Nigeria: Bamenda, Jua, 3,000-3,500 ft. (April)! Lakom, 6,000 ft. (April)! Also in Cameroons. Exsicc.—Collenette 61. Thienemann (not seen). Büttner 647 (not seen). Young 232. Datz. 571. Lely 237; P. 320; P. 333. Lugard. Maitland 1625; 1780. Chev. 827.

2. *B. sceptrum* Schltr. l.c. 114. A slender herb about 3 ft. high with lilac and white flowers.

S. Nigeria: N. of Bakossi Mts. (July). Also in Cameroons. Exsicc.—Walker (not seen).

3. *B. Schweinfurthii* Rehb. f.—F.T.A. 7: 201. A slender herb with purple-spotted flowers.

Upper Volta: Kong Distr.! N. Nigeria: Zungeru (June)! Lokoja! Abinsi (June and July)! Kontagora (June)! Nupe! Liruwen-Kano Hills! Bauchi Plateau (June)! Wana, 1,700 ft. (June)! S. Nigeria: Bamenda, Lakom, 6,000 ft. (April)! Also in Cameroons and Belgian Congo. Exsicc.—Bouet 2560. Lugard. Datz. 561; 836; s.n. Hepburn 119. Yates. Carpenter. Lely P. 384. Maitland 1787.

4. *B. Kalbreyeri* Rehb. f.—F.T.A. 7: 201. A slender herb with large violet coloured flowers in a short raceme.

Cameroons Mt., 5,500-6,000 ft. (March)! Exsicc.—Kalbreyer 145.

Var. *glandulosa* Braid in Kew Bull. 1925, 360. Epiphytic; stems hairy at base; flowers mauve, otherwise as type.

Sierra Leone: Heddles Farm (June)! Wara! Makump (July)! Ndijajula, near Njala (May)! Exsicc.—Lane-Poole 376. Dawe 489. Thomas 894. Deighton 700. Bunting.

5. *DIPLACORCHIS* Schltr. in Beih. Bot. Centralbl. 38, II: 127.

Robust plant; petals free from column; front lobe of lip shorter than side lobes; spur under 5 mm. long

1. ashantensis

Slender plant; petals united to column at base; front lobe of lip much longer than side lobes; spur over 5 mm. long

2. Engleriana

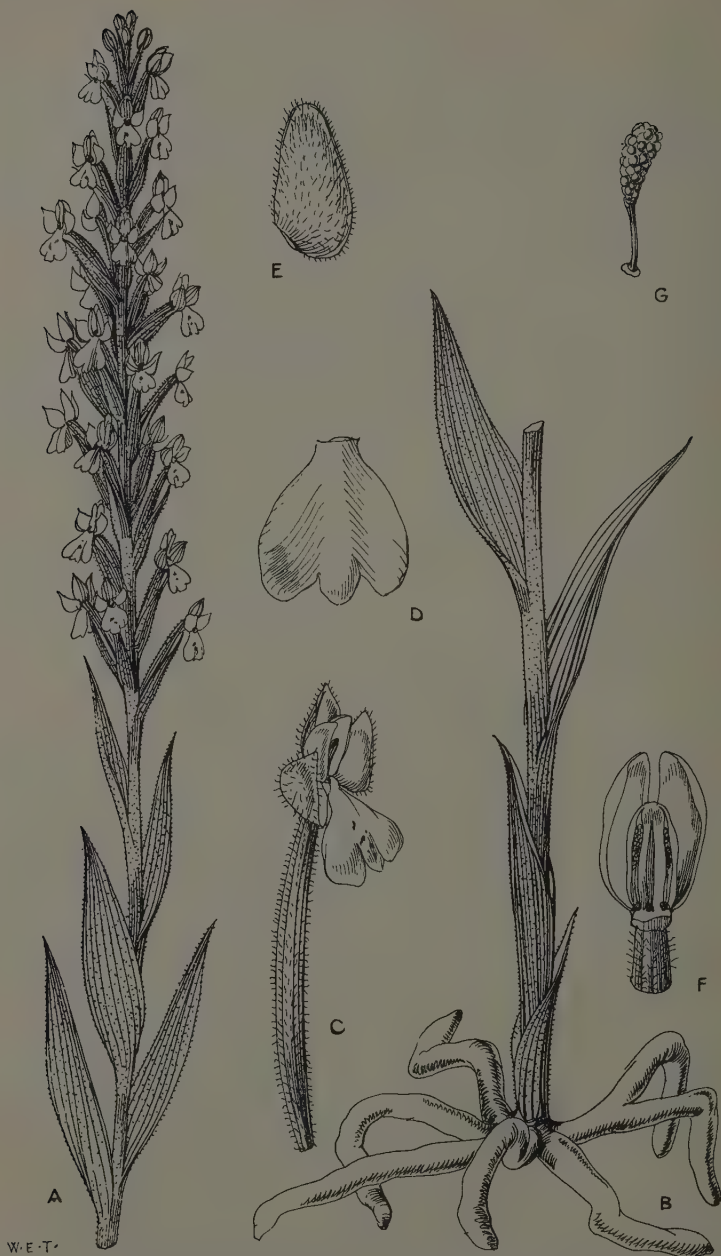


FIG. 323.—*BRACHYCORYTHIS SUDANICA* Schltr. (ORCHIDACEAE).

A, upper part of stem and inflorescence. B, base of stem and roots. C, flower. D, lip.
E, lateral sepal. F, column and petals. G, pollinium.

1. *D. ashantensis* Summerhayes in Kew Bull. 1931, 378. Erect herb up to 3 ft. high; raceme about 10 in. long, bracts projecting far beyond flowers; flowers white and purple.
Gold Coast; Amoma (July)! Exsicc.—Chipp 531.
2. *D. Engleriana* Schltr. l.c. 129. *Platanthera Engleriana* Rolfe—F.T.A. 7: 204. Slender herb up to 3 ft. high, raceme 4 in. long or less, bracts not much projecting; flowers reddish, sepals with greenish tips.
N. Nigeria: Katsina Allah (August)! Exsicc.—Datz. 835.

6. PHYLLOMPHAX Schltr. in Fedde, Repert. Beih. 4: 118.

Terrestrial herb, up to 60 cm. high; tubers potato-like, 4 cm. long; stems erect, leafy, glabrous with a few sheaths at the base; leaves 4–8, lower reduced, broadly elliptical, obtuse, upper elliptical-lanceolate or elliptical, acute, lamina up to 11 cm. long and 5 cm. broad; inflorescence rather laxly 5–20-flowered, bracts similar to the upper leaves but smaller, exceeding or nearly equalling the flowers; sepals and petals pale green or brown-spotted; lip lilac or mauve, obcordate, up to 3 cm. long and 2 cm. wide *Helleborina*

- P. *Helleborina* Schltr. l.c. 119. *Platanthera helleborina* Rolfe—F.T.A. 7: 204; Cat. Talb. Nig. Pl. 147.
French Guinea: Timbo (Aug.)! Futa-Jallon, Ditinn (Sept.)! Kouria-Langury (Aug.)! Sierra Leone: Freetown, Sugarloaf Mt., in shady places (Dec.)! Jigaya (Nov.)! Kanike (Sept.)! Bagwema, Bafi River (July–Aug.)! Jamadu! York Pass! Banana Is., Prospect Hill (Oct.)! S. Nigeria: Bamenda, Fonfuka, 3,000 ft. (June)! Also in the Cameroons. Exsicc.—Sc. Elliot 4061. Turner. Burbridge 147. Thomas 2046; 2738. Dowe 547. Glanville 361. Maitland 1639. Bunting. Talb. 869. Pobéguin 1671. Caille 14652. Chev. 18517; 18533.

7. CYNORCHIS Thouars—F.T.A. 7: 259.

Inflorescence 1–2-flowered; flowers 1–1.5 cm. in diameter; lip 3-lobed, 7–10 mm. long, side lobes narrow, diverging, middle lobe suddenly fan-shaped from a narrow base; spur 11–16 mm. long; petals linear; leaves short and narrow in a basal tuft 1. *parva*
Inflorescence up to 14-flowered; flowers 4–5 mm. in diameter; lip 5-lobed, 2–3 mm. long, lowest 2 lobes reduced to teeth, other 3 lobes oblong, subacute, middle longer than laterals; spur 2 mm. long; petals ovate; leaves 2, up to 9 cm. long and 1.5 cm. wide 2. *debilis*

1. *C. parva* Summerhayes in Kew Bull. 1932, 338. A small ground orchid 2–6 in. high with green and white flowers; grassy plains.
French Guinea: Timbo (July)! N. Nigeria: Vom, 3,000–4,500 ft. between Hepham and Ropp, 4,600 ft. (July)! Bauchi Plateau (June)! Randa, 1,500 ft. (July)! S. Nigeria: Bum, Bamenda Distr., 4,000 ft. (May–June)! Exsicc.—Dent Young. Lely 361; P. 337. Maitland 1398; 1669. Pobéguin 1592. Hepburn 121.
2. *C. debilis* Summerhayes in Kew Bull. 1933, 246. *Habenaria debilis* Hook. f.—F.T.A. 7: 213. A ground orchid 3–7 in. high.
Cameroons Mt., 5,000–7,000 ft. (Nov.)! Exsicc.—Mann 2127.

8. HABENARIA Willd.—F.T.A. 7: 206.

Lip superior, trilobed at apex only; sepals and ovary hairy; spur erect, somewhat incurved, 15 mm. long; petals shortly bidentate at apex; leaves radical, ovate

1. *occidentalis*

Lip inferior:

*Petals simple:

Lip simple:

Dorsal sepal 6.5–8 mm. long; anther-canals elongated, nearly 3 mm. long; posterior half of petal usually not infolded; stigmas free 2. *leonensis*

Dorsal sepal 4–6 mm. long; anther-canals very short; posterior half of petal infolded; stigmas usually connate 3. *zambesina*

Lip trilobed:

Side lobes of lip pectinate or fimbriate:

Flowers small; dorsal sepal 7 mm. long; lip 1 cm. long, middle lobe flabellate, emarginate with a central apiculus, front margin pectinate, spur 2.5–3 cm. long; plant 10–15 cm. high, 1–2-flowered; leaves linear-lanceolate, 1–4 cm. long, 2–4 mm. broad 4. *Jacobi*

Flowers large; dorsal sepal over 15 mm. long; lip over 2 cm. long, middle lobe linear or linear-oblong, entire, subacute; plant 15–50 cm. high, usually over 4-flowered; leaves 5–25 cm. long, 7.5–55 mm. broad:

Side lobes of lip semi-ovate or fan-shaped, shortly pectinate; spur over 5 cm. long; anther-loculi approximate; leaves broadly oblong-lanceolate:

Lip about 3.5–4 cm. across, lobes divergent; side lobes fan-shaped, deeply cordate on each side of claw; spur 15 cm. long 5. *Engleriana*

Lip about 2.5 cm. across, lobes nearly parallel; side lobes semi-ovate, bases at right angles with claw; spur about 5 cm. long 6. *prionocraspedon*

Side lobes of lip linear, divided into many narrow segments on the outer edge; spur 1.2–2.2 cm. long; anther-loculi distant at the ends of the narrow ribbon-shaped connective; leaves linear-lanceolate 7. *Mannii*

Side lobes of lip entire:

Leaves suborbicular, radical, adpressed to the ground; perianth-segments ovate-lanceolate, acuminate; lip-segments narrowly lanceolate, of equal length; spur about 3 cm. long 8. *Lelyi*

- Leaves cauline, or if radical neither suborbicular nor adpressed to the ground :
 Column elongated, over 13 mm. high, the anther at the apex ; anther-canals free from the side lobes of the rostellum ; stigmas cushion-like, partially confluent ; leaves in a tuft at the base, lanceolate, up to 25 cm. long ; lobes of lip filiform 9. *macrandra*
- Column short, less than 6 mm. high ; anther-canals united to the side lobes of the rostellum ; stigmas stalked or nearly sessile, but not cushion-like nor confluent :
 Spur 4 cm. or more long ; dorsal sepal 8-12 mm. long :
 Leaves linear-lanceolate, less than 1 cm. wide ; spur 4-5 cm. long ; terrestrial on rocks 10. *Weileriana*
 Leaves lanceolate or narrowly ovate, 2-5 cm. wide ; spur 6-10 cm. long ; usually epiphytic 11. *procera*
- Spur less than 3 cm. long ; dorsal sepal up to 6 mm. long :
 Leaves in a basal tuft ; petals linear ; dorsal sepal 5-7 mm. long ; column 3.5-4 mm. high 12. *Buntingii*
- Leaves at intervals along lower half of stem :
 Spur 1-1.5 mm. long, shorter than the lip ; lip broad, shortly trilobed, middle lobe with an elevated keel ; anther-canals very short ; stigmas nearly sessile ; leaves elliptic-lanceolate, acuminate, up to 10 cm. long and 4 cm. wide 13. *microceras*
- Spur 10 mm. or more long, longer than the lip :
 Spur filiform, not much thickened at apex ; leaves narrowly lanceolate ; dorsal sepal up to 4 mm. long :
 Petals ovate ; middle lobe of rostellum very short, 0.25 mm. long, somewhat hoodlike 14. *attenuata*
 Petals linear or narrowly lanceolate ; middle lobe of rostellum narrow, elongated, 1.25 mm. long 15. *filicornis*
- Spur stouter, more or less club-shaped ; leaves broadly lanceolate ; dorsal sepal 5-6 mm. long :
 Petals obovate ; spur much dilated at apex ; stigmas club-shaped 16. *obovata*
- Petals ovate ; spur moderately dilated at apex ; stigmas awl-shaped, acute ; stem very leafy 17. *Dinklageri*
- **Petals bilobed or bipartite, the posterior lobe often adnate to the dorsal sepal :
 Spur 5 cm. or more in length :
 Leaves 1-2, radical, suborbicular and adpressed to the ground :
 Rhachis and flowers hairy ; leaf 1, about 3-4 cm. long, the edges hairy ; segments of lip and anterior petal-segments filiform ; dorsal sepal about 6 mm. long ; spur about 6 cm. long 18. *Lecardii*
- Rhachis and flowers glabrous ; leaves 2 ; dorsal sepal 9 mm. long or more ; spur about 10 cm. long :
 Leaves 3-5 cm. long ; segments of lip and anterior petal-segments oblanceolate, 2.5-4 mm. wide, a little longer than the sepals ; scape almost covered with large sheaths 19. *macrura*
- Leaves 4-15 cm. long ; segments of lip and anterior petal-segments filiform, much longer than the sepals ; sheaths on scape relatively small 20. *armatissima*
- Leaves cauline, not suborbicular :
 Lobes of lip and anterior petal-lobe lanceolate ; anther-canals much shorter than stigmas ; spur 14-17 cm. long 21. *Walleri*
- Lobes of lip and anterior petal-lobe linear or lanceolate-linear ; anther-canals slightly longer than stigmas :
 Anterior petal-lobe linear-lanceolate, fleshy, strongly recurved in upper part, 2-3.5 cm. long ; spur up to 7 cm. long 22. *Holubii*
- Anterior petal-lobe filiform, more or less straight at apex, 4.5-7.5 cm. long ; spur 5-17 cm. long :
 Spur 12-17 cm. long, moderately swollen near end, tapering again towards apex itself 23. *cirrhatta*
- Spur 5-3 cm. long, suddenly swollen at apex to form a rounded obtuse sac 24. *Laurentii*
- Spur 4 cm. or less in length :
 Dorsal sepal 1 cm. long or more :
 Petal-segments linear or almost filiform ; spur less than 2 cm. long ; leaves broad, up to 12 cm. long :
 Petals divided nearly to base, segments glabrous ; side lobes of lip longer than middle lobe, side lobes spreading, middle lobe hanging vertically downwards, narrow ; leaves in a group just above the middle of the stem ; stigmas not swollen at apex 25. *barrina*
- Petals divided two-thirds down, segments ciliate ; side lobes of lip shorter than middle lobe ; leaves in lower half of stem ; stigmas club-shaped 26. *longirostris*

Petals divided two-thirds down, posterior segment lanceolate, anterior curved, oblong, much shorter; spur 3-4 cm. long; leaves narrower, up to 6 cm. long

27. *phylacochaيرا*

Dorsal sepal less than 7 mm. long:

Leaves oblong-lanceolate, up to 4 cm. broad; dorsal sepal 3-5-5 mm. long; lip 3-partite, lobes linear, 4-6 mm. long; stigmas obliquely clavate, 1-5-3 mm. long 28. *Buetneriana*

Leaves linear-lanceolate or linear, never more than 2 cm. broad and usually much narrower:

Anterior petal-segment shorter than posterior:

Stigmatic processes slender, capitate, 6-10 mm. long; plant 50-70 cm. high; spur 13 mm. long, slightly swollen in distal half 29. *Vogelia*

Stigmatic processes stouter, 2-3 mm. long; plant up to 40 cm. high; spur under 10 mm. long:

Leaves narrowly linear; inflorescence not dense; sepals obovate; anterior petal-segment wider than posterior; segments of lip narrow-linear or filiform 30. *pauper*

Leaves narrowly lanceolate; inflorescence dense; sepals obliquely lanceolate (semi-ovate); anterior petal-segment narrower than posterior; segments of lip broadly linear 31. *Bongensium*

Anterior petal-segment longer than posterior:

Spur spirally twisted in middle and sharply incurved, much swollen at the apex, 9-13 mm. long; lobes of lip narrowly linear, middle lobe 9-11 mm. long, longer than laterals 32. *anaphysema*

Spur straight or slightly curved, not spirally twisted or if so not incurved:

Petals divided for two-thirds of the length only, anterior segment narrower than posterior; spur very slender, slightly incurved, not thickened at end, 5-7 mm. long; lobes of lip narrowly linear; stigmas 6-7 mm. long, obliquely clavate at the apex 33. *Dalzielii*

Petals divided almost to the base:

Lateral sepals semi-orbicular, acute, not laterally apiculate; lobes of lip linear-lanceolate, very acute, about equal in length; anterior petal-lobe falcate, posterior lanceolate, thickened on side towards dorsal sepal; spur 13-14 mm. long 34. *ruvenzoriensis*

Lateral sepals obliquely obovate, laterally apiculate; lobes of lip narrowly linear, not very acute, middle distinctly longer than laterals:

Leaves very narrow, 7 mm. wide or less:

Inflorescence very open with short bracts, 6-many-flowered; dorsal sepal 3-4 mm. long; anterior petal-lobe wider than posterior; spur 10-15 mm. long, swollen at the end 35. *ichneumonea*

Inflorescence 3-5-flowered, bracts half as long as pedicels; dorsal sepal 5-6 mm. long; posterior petal-lobe more than twice as wide as anterior; spur 7-8 mm. long, gradually widened to apex 36. *angustissima*

Leaves broader, 8-14 mm. wide:

Bracts equalling or longer than pedicel + ovary; dorsal sepal 6-7 mm. long; spur 16-20 mm. long, thickened in lower half, rather acute

37. *huillensis*

Bracts considerably shorter than pedicel + ovary; dorsal sepal 5-6 mm. long:

Staminodes tongue-shaped, entire; leaves rather short, 4-6 cm. long; stigmas obliquely truncate at the apex; spur 18 mm. long, distinctly swollen in the lower half and narrowly club-shaped 38. *linguiformis*

Staminodes bilobed; leaves longer, up to 14 cm. long:

Spur 12-20 mm. long, equal in thickness except for a very small swelling at apex; staminodes deeply bilobed with distinct stalk; stigmas obliquely club-shaped; a rather robust plant with many-flowered racemes 39. *chirensis*

Spur 10-11 mm. long, gradually swollen in lower half and club-shaped; staminodes almost sessile; stigmas capitate with concave surface; a slender plant with fewer-flowered racemes (up to 15)

40. *Maitlandii*

1. *Habenaria occidentalis* Summerhayes in Kew Bull. 1933, 246. *Amphorchis occidentalis* Lindl.—F.T.A. 7: 262. *A. atacorensis* Chev. Bot. 621. A ground orchid about 1 ft. high; leaves with white veins; flowers orange or yellow.

Dahomey: Atacora Mts. (June) ! S. Nigeria: Jeba ! Also Chari. Exsicc.—Barter 1487. Chev. 24194.

2. *H. leonensis* Kraenzl. ex Dur. & Schinz—F.T.A. 7: 212. A ground orchid, but sometimes epiphytic; flowers white.

French Guinea: Dalaba-Diaguissa, 3,000-4,000 ft. (Oct.) ! Sierra Leone: York Pass. Yakola (Sept.) ! Jigaya (Sept.) ! Bunbuna (Aug.) ! Exsicc.—Burbidge 148. Thomas 2364; 2378; 2572; 2737. Deighton 1212. Chev. 18787b.

3. *H. zambesina* Rehb. f.—F.T.A. 7: 211. *H. baoulensis* A. Chev. Bot. 620. A ground orchid up to 4 ft. high, with leafy stem; flowers white in dense spike; in meadows or marshes.

- French Guinea: Beyla, near Férédougoua, 1,750 ft. (July)! Billima (Sept.)! Sierra Leone: Gloucester Saddle (Aug.)! Binkolo (Aug.)! Yetaya (Sept.)! Ronletta (fr. Nov.)! Jigaya, 1,100 ft. (Sept.)! Ivory Coast: Bondoukou (Oct.)! Marabadi-Gottoro (July)! Gold Coast: Ashanti, Kintampo (June)! Northern Province: Peepease (July)! N. Nigeria: Katsina Ala (June)! Vom, 3,000–4,500 ft.! Naraguta (July)! Mongu, 4,300 ft. (July)! S. Nigeria: Ogoja District! Bamenda, Uchan, 5,600 ft. (June)! Extends to Uganda, Nyasaland and the Zambesi. Exsicc.—*Collenette* 67. *Thomas* 1797; 2300; 2685; 2711; 5309. *Glaville* 362. *Lane Poole* 383. *Caille* 15044. *Chev.* 22034; 34090. *Vigne* 3060; 3934. *Akpabia* 178. *Dalz.* 837. *Lely* 405; 461; P 629. *Maitland* 1387.
4. *H. Jacobi Summerhayes* in Kew Bull. 1935, 196. French Guinea: Kindia! Exsicc.—*Jacques* 140.
5. *H. Engleriana Kraenzl.*—F.T.A. 7: 222. *H. Hunteri* Rolfe.—A herb up to 2 ft. high, with lanceolate, acute leaves up to the inflorescence; flowers large, white, in a few-flowered raceme. Gold Coast: 7 locality! Togoland: Bismarckburg (April)! Exsicc.—*Hunter. Büttner* 692.
6. *H. prionocraspedon Summerhayes* in Kew Bull. 1932, 342. A terrestrial herb with lanceolate, acute leaves all up the stem, and a dense raceme of rather large white flowers. S. Nigeria: Boshi, Ogoja Distr., 3,500 ft. Exsicc.—*Roseaver* 61/29.
7. *H. Mannii Hook f.*—F.T.A. 7: 225. A slender erect herb up to 18 in. high with leafy stem and a dense raceme of a few to 25 large green flowers; on grassy plains and rocky slopes. N. Nigeria: Naraguta and Jos (Sept.)! Vom, 3,000–4,500 ft.! S. Nigeria: Bamenda Distr., Uchan, 5,000 ft. (June)! Basenako-Lokom, 6,000 ft. (June)! Cameroons Mt., 7,000 ft. (Nov.)! 5,000–9,000 ft.! 8,000 ft. (fr. Feb.)! Fernando Po: Moka. Exsicc.—*Lely* 560; P 609. *Dent Young. Mann* 2119. *Johnston* 87. *Maitland* 107; 1617; 1643b. *Preuss* 892 (not seen). *Tessmann* 2829 (not seen).
8. *H. Lelyi Summerhayes* in Kew Bull. 1932, 188. Erect, 12–18 in. high, with a single basal-leaf adpressed to the ground and sheath-like scales on the scape; raceme about 8-flowered; flowers white. N. Nigeria: Ropp, 4,600 ft. (July)! Exsicc.—*Lely* 457.
9. *H. macrandra Lindl.*—Cat. Tab. Nig. Pl. 147. *Podundria macrandra* Rolfe.—F.T.A. 7: 206. Terrestrial herb to 2 ft. high, with thick woolly roots, a tuft of radical leaves, and a lax raceme of star-like white and pale green flowers; forests. Sierra Leone: Konina (Nov.)! Sennihun to Gene (Nov.)! Liberia: Gola! Nyalai (Oct.)! Medina-Bumbuna (Oct.)! Suen (Nov.)! Ribbo-Zike (Nov.)! Gold Coast: Assuanti! Popokyeré, E. of Tarquah (April)! Aburi Hills (Oct.)! Agozo-Kumawu (Nov.)! Togo: Alavanyo, 750–1,000 ft. (Sept.)! S. Nigeria: banks of Bonny River (Oct.)! Oban! Cameroons Mt., 3,000 ft. (Nov.)! Uganda, Tanganyika Territory and Angola. Exsicc.—*Glaville* 122. *Deighton* 306. *Linder* 1007; 1007A; 1007B. *Johnston* 454. *Chipp* 198. *Gillet* 5. *Fishlock* 30. *Mann* 518; 2117. *Bunting* 32. *Talbot* 775. *Thompson* 1471.
10. *H. Weileriana Schltr.* in Engl. Bot. Jahrb. 38: 149; Cat. Tab. Nig. Pl. 147. Herb up to 1 ft. high, with leafy stem and white flowers; among rocks by streams. S. Nigeria: Bibundi (Nov.)! Ndebbiga (Oct.)! Exsicc.—*Weiler. Mildbraed* 10660. *Talb.* 844; 868.
11. *H. procerà Lindl.*—F.T.A. 7: 220; Chev. Bot. 621; Cat. Tab. Nig. Pl. 147. Usually an epiphyte up to 18 in. high with leafy stem and white flowers. Sierra Leone: Mapaki, Northern Province (Aug.)! Kafoko (Sept.)! Ivory Coast: Mt. Niénokué, 1,500 ft. (July)! Gold Coast: Afoso (Aug.)! Birrim (Oct.)! Cameroons Mt.: Buea (May)! Exsicc.—*Deighton* 1217. *Thomas* 2115. *Fishlock* 82. *Deistel. Maitland* 736. *Talb.* 773. *Chev.* 19467.
12. *H. Buntingii Rendle* in Cat. Tab. Nig. Pl. 109. Terrestrial up to 18 in. high; leaves in a basal tuft; flowers white or pale pinkish-green; in forests. Sierra Leone: Sennihun-Gene (Nov.)! Liberia: Banga (Oct.)! Totokwelli, Medina (Oct.)! Fayapulu (Oct.)! Moylakwelli (Oct.)! Gonyon (Nov.)! Gold Coast: Santrokofi, near Hohoe, 750–1,500 ft. (Oct.)! Exsicc.—*Deighton* 806. *Linder* 1135; 1175; 1175A; 1175B. *Bunting. Thompson* 1489.
13. *H. microceras Hook f.*—F.T.A. 7: 213. *Peristylus Preussii* Rolfe. A leafy terrestrial herb up to 3 ft.; flowers small, green, in a narrow spike 2–10 in. long. Cameroons Mt., 7,000–10,000 ft. (Sept.-Nov.)! Exsicc.—*Mann* 2116. *Johnston* 31; 32. *Preuss* 967.
14. *H. attenuata Hook f.*—F.T.A. 7: 216. *H. clarencensis* Rolfe. A slender terrestrial herb up to 2 ft. high with narrow leaves; flowers small, green. Cameroons Mt.: 7,000–10,000 ft. (Nov.)! Fernando Po: Clarence Peak, on summit, 10,000 ft. (Dec.)! Exsicc.—*Mann* 645; 2118. *Johnston* 30; 33.
15. *H. filicornis Lindl.*—F.T.A. 7: 216; Chev. Bot. 620. A slender herb up to 18 in. high with narrow leaves; flowers small, green, in an open spike; in grassy plains and marshes. Ivory Coast: Kodiokofi (Aug.)! N. Nigeria: Hepharm-Ropp, 4,600 ft. (July)! Vom, 3,000–4,500 ft.! Bauchi Plateau (June)! Zungeru (Sept.)! Exsicc.—*Thonning. Lely* 374; P 330. *Dent Young. Dalz.* 232. *Chev.* 22345.
16. *H. obovata Summerhayes* in Kew Bull. 1932, 191. *Roeperocharis occidentalis* Kraenzl. 'A terrestrial herb up to 18 in. high; flowers small, green, in a dense spike. Cameroons Mt., 7,000–10,000 ft. (Dec.)! Exsicc.—*Johnston* 29. *Maitland* 804.
17. *H. Dinklagei Kraenzl.* in Engl. Bot. Jahrb. 51: 374. A terrestrial herb 18 in. high with leafy stem; leaves broadly lanceolate, acute; flowers white; flowers white in short spike. Liberia: Sinoe (Nov.)! Exsicc.—*Dinklage* 2330.
18. *H. Lecardii Kraenzl.*—F.T.A. 7: 228. Herb up to 15 in. high; flowers white in short lax raceme. Senegal: Mahina! French Sudan: Gourma, Firon-Konkobiri (July)! N. Nigeria: Tagina near Zungeru (June)! Exsicc.—*Lecard* 190. *Dalz.* 566. *Chev.* 24350.
19. *H. macrura Kraenzl.*—F.T.A. 7: 229. Herb 1–2 ft. high; flowers greenish-white in few-flowered racemes. N. Nigeria: Vom, Bauchi Plateau, 3,000–4,500 ft.! Also in Cameroons and Belgian Congo to Angola, Nyasaland and N. Rhodesia. Exsicc.—*Dent Young.*
20. *H. armatissima Rehb. f.*—F.T.A. 7: 227. *H. eburnea* Ridl. *H. Lugardii* Rolfe. *H. yalengensis* Chev. Bot. 621. Erect herb 1–2 ft. high, with a broad raceme of white flowers; among bushes. French Sudan: Yatenga, Ouahigonya (Aug.)! N. Nigeria: Mandara! East to Abyssinia, Nyasaland, Rhodesia and South-West Africa. Exsicc.—*Vogel. Chev.* 24809.
21. *H. Walleri Rehb. f.*—F.T.A. 7: 247. *H. Soyauzii* Kraenzl. Slender herb up to 2½ ft. high; flowers large, white, in few-flowered racemes; in marshes and wet grasslands. N. Nigeria: Kilba country, Yola (Aug.)! Bauchi Plateau (June)! Jos (June)! Mima (June)! Zaria (July)! Also in Cameroons, Uganda, Nyasaland and the Zambesi. Exsicc.—*Dalz.* 220. *Lely* 315; P 383.
22. *H. Holubii Rolfe.*—F.T.A. 7: 249. *H. valida* Schltr. An erect herb up to 2½ ft. high with leafy stem and a raceme of large greenish-white flowers; in meadows. Togo: Quamikrum (March)! N. Nigeria: Abinsi (Oct.-Nov.)! Zungeru (Aug.)! Lokoja! Also in Kenya Colony, S. Tanganyika Territory, Belgian Congo, Zambesi valley. Exsicc.—*Thienemann. Dalz.* 229; 839. *Lugard.*
23. *H. cirrhata Rehb. f.*—F.T.A. 7: 248. *H. Zenkeriana* Kraenzl.—An erect herb up to 3 ft. high with leafy stem and raceme of large white flowers; in grasslands. French Guinea: Bonhour (July)! Kindia (July)! Togo! N. Nigeria: Bauchi Plateau (Aug.)! Kilba country (Aug.)! Throughout Tropical Africa and Madagascar. Exsicc.—*Pobéguin* 375. *Dalz.* 221. *Lely* P 615. *Jacques* 1.
24. *H. Laurentii De Wild. Notic. Pl. Util. Congo*, 2: 325. A leafy erect herb up to 2½ ft. high, with a raceme of large white flowers; in grassland and scrub. N. Nigeria: Naraguta (June)! Abinsi and Katsina Allah (Sept.)! Bauchi Plateau (July)! Kontagora Prov. (June)! Also in Kenya Colony and Belgian Congo. Exsicc.—*Dalz.* 565. 840. *Lely* 319; P 397.



FIG. 324.—*HABENARIA HOLUBII* Rolfe (ORCHIDACEAE).

A, upper part of stem and inflorescence. B, base of stem and tuber. C, lip. D, stigma. E, pollinium. F, anther and rostellum middle lobe.

25. *H. harrina* Ridl.—F.T.A. 7: 229, in syn. under *H. thomana* Rehb. f.; Cat. Talb. Nig. Pl. 147. ? *H. membranacea* Lindl. A leafy herb up to 18 in. high; in forests.
Ivory Coast: Cavally basin, Késta (July) ! N. Nigeria: Ilaro (Sept.) ! Oban ! Also in St. Thomas I. Exsicc.—*Talb.* 923. *Punch. Chev.* 19364.
26. *H. longirostris Summerhayes* in Kew Bull. 1932, 192. An erect herb up to 2 ft. high; flowers scented, green and white in a many-flowered raceme.
N. Nigeria: Vom, 3,000–4,500 ft. ! Naraguta (July) ! Bauchi Plateau (Aug.) ! Wana, 1,700 ft. (Aug.) ! Uganda. Exsicc.—*Dent Young.* Lely 462; P 630. *Hepburn* 120.
27. *H. phylacoeira Summerhayes* in Kew Bull. 1932, 190. A slender erect herb up to 18 in. high; flowers green and white in a short few-flowered raceme.
N. Nigeria: Ropp, 4,600 ft. (July) ! Vom, 3,000–4,500 ft. ! Exsicc.—*Lely* 451. *Dent Young.*
28. *H. buettneriana Kraenzl.*—F.T.A. 7: 237. A leafy herb up to 3½ ft. high, with a long raceme of small green flowers.
French Guinea: Mamou (Aug.) ! Between Kowia and Trébéléya (Sept.) ! Togo: Bismarckburg (June) ! Santrokofé, 1,000 ft. (Oct.) ! Exsicc.—*Pobéguin* 1676. *Büttner* 213; 238. *Chev.* 18232. *Thompson* 1482.
29. *H. Vogelii Ridl.*—F.T.A. 7: 241. An erect herb about 2 ft. high with open racemes of small whitish flowers.
Lake Chad District: Mora (Aug.) ! Exsicc.—*Vogel* 40.
30. *H. pauper Summerhayes* in Kew Bull. 1932, 341. A slender herb 1 ft. high, with very small white flowers; stony grasslands.
S. Nigeria: Bamenda, 5,000 ft. (May) ! Also Tanganyika. Exsicc.—*Maitland* 1562.
31. *H. gongensium Rehb. f.*—F.T.A. 7: 233. A slender herb up to 18 in. high, with a dense raceme of small white flowers.
N. Nigeria: Abinsi ! Mongu, 4,300 ft. (July) ! Randa, 1,500 ft. (July) ! Also in Cameroons and E. Sudan. Exsicc.—*Dalz.* 854. *Lely* 407. *Hepburn* 122.
32. *H. anaphysemia Rehb. f.*—F.T.A. 7: 235. *H. confusa* Rolfe. Erect herb up to 2 ft. high; flowers greenish-white in lax racemes; in damp grasslands, and on wet rocks.
Senegal: Sedhiou ! French Guinea: between Kouria and Ymbo (Oct.) ! Sierra Leone: Mt. Oril (March) ! Bumbuna (Oct.) ! Benikoro, 1,000 ft. (Oct.) ! Kanya, 1,500 ft. (Oct.) ! Hill Station (Oct.) ! Liberia: Duport (Nov.) ! Ivory Coast: Man (Sept.–Oct.) ! Sassandra and Cavally Rivers ! N. Nigeria: Naraguta (Aug.) ! Vom, 3,000–4,500 ft. ! Bauchi Plateau (July) ! S. Nigeria: Bum, near Bamenda, 4,000 ft. (June) ! Also in French Congo and Angola. Exsicc.—*Porteres. Lane Poole* 366. *Thomas* 2894; 2978; 8035; 8136; 3216; 3771. *Deighton* 2173 (partly). *Linder* 1506. *Lely* 508; P 512. *Dent Young. Maitland* 1640; 1641. *Caille* 14966. *Chev.* 2555; 34172.
Many of the Sierra Leone specimens bear only abnormal flowers in which the lip is more or less reduced.
33. *H. Dalzielii Summerhayes* in Kew Bull. 1932, 339. An erect herb up to 3 ft. high with a lax raceme of green flowers; in swamps.
Sierra Leone: Hill Station (Oct.) ! N. Nigeria: Kilba country (Aug.) ! Exsicc.—*Deighton* 2173 (partly). *Dalz.* 222.
34. *H. ruwenzoriensis Rendle*—F.T.A. 7: 233. An erect herb up to 2½ ft. high; flowers green in a rather dense raceme; in swamps.
N. Nigeria: Zungeru (Sept.) ! Vom, 3,000–4,500 ft. (Aug.) ! Also on Ruwenzori. Exsicc.—*Dalz.* 228. *Dent Young.*
35. *H. angustissima Summerhayes* in Kew Bull. 1933, 249. A small terrestrial herb about 6–12 in. high, with a rather lax few-flowered raceme 1½–3 in. long.
French Guinea: Mamou (Aug.) ! Exsicc.—*Pobéguin* 1680.
36. *H. ichneuomonea Lindl.*—F.T.A. 7: 240. A very slender herb up to 18 in. high, with an open raceme of small green or reddish-green flowers; in marshes.
French Sudan: Folo (May) ! French Guinea: Kouria to Trébéléya (Sept.) ! Sierra Leone: Waterloo, Foni Flats (Aug.) ! N. Nigeria: Vom, Bauchi Plateau, 3,000–4,500 ft. ! Exsicc.—*Afzelius. Deighton* 2064. *Dent Young. Chev.* 826; without number.
37. *H. huillensis Rehb. f.*—F.T.A. 7: 240. An erect herb up to 2½ ft. high; flowers greenish in rather dense, many-flowered racemes.
N. Nigeria: Bauchi Plateau (Sept.) ! Zaria (Sept.) ! Also in Angola. Exsicc.—*Lely* P 732. *Bryant.*
38. *H. linguiformis Summerhayes* in Kew Bull. 1932, 340. An erect herb, 1 ft. high; flowers green and white.
N. Nigeria: Bukuru to Hephham, 4,300 ft. (July) ! Exsicc.—*Lely* 343A.
39. *H. ebiensis Rehb. f.*—F.T.A. 7: 238. *H. limnophila Summerhayes*. An erect herb up to 3 ft. high; flowers green and white in dense or more rarely rather lax racemes.
N. Nigeria: Bauchi Plateau (June) ! Bukuru to Hephham, 4,300 ft. (July) ! Also in Uganda, Tanganyika Territory and Kenya Colony. Exsicc.—*Lely* 343; P 379.
40. *H. Maitlandii Summerhayes* in Kew Bull. 1932, 341. A herb up to 1 ft. high; flowers white in short racemes.
S. Nigeria: Uchan, Bamenda Distr., 5,600 ft. (June) ! Exsicc.—*Maitland* 1386.

9. PLATYCORYNE Rehb. f.—F.T.A. 7: 255.

Lip quite entire; leaves evenly scattered along the stem, up to 5 cm. long and 1 cm. broad:

Inflorescence 1–5-flowered; middle lobe of rostellum narrowly lanceolate, either short and tooth-like or up to nearly as long as the anther and closely adpressed to it, side lobes slender, not much wider than the anther-canals, the latter 2–8–4 mm. long; dorsal sepal 6.5–9–5 mm. long; petals entire; lip usually 5–7 (sometimes to 9) mm. long, spur 8–11–5 mm. long, sometimes shorter by partial abortion; stigmas club-shaped, 2–2–8 mm. long 1. *paludosa*

Inflorescence 6–9-flowered; middle lobe of rostellum lanceolate, much broadened at the base, overtopping the anther, and placed some distance in front of it, side lobes stout from a broad base, much wider than the anther-canals, the latter 2–5 mm. long; dorsal sepal 7 mm. long; petals entire; lip 6–7 mm. long, spur much thickened in lower part, 14 mm. long; stigmas with broad flattened ovate apex, 2–5 mm. long 2. *megalarhyncha*

Lip with a short tooth-like lobe on each side near the base; leaves mostly in a bunch at the base of the stem, but a few scattered all along, up to 2–5 cm. long and 4–5 mm. broad; inflorescence 2–6-flowered; dorsal sepal 6.5–7–5 mm. long; petals entire; lip 5–7 mm. long, lateral lobes 0.3–0.5 mm. long, middle lobe 4–5 mm. long, much broader, spur much thickened in the lower part, 9–11–5 mm. long; anther shortly apiculate, canals 1.5–2 mm. long; rostellum middle lobe narrowly lanceolate, acute,



FIG. 325.—*PLATYCORYNE PALUDOSA* Rolfe (ORCHIDACEAE).

A, flower, in side view. B, the same, front view. C, column. D, pollinium.

shorter than the anther, side lobes rather stout; stigmas club-shaped, 1.5–2 mm. long 3. *elegantula*

1. *P. paludosa* Rolfe—F.T.A. 7: 256; Chev. Bot. 622. *P. aurea* Rolfe. *P. Wilfordii* Rolfe. A slender terrestrial herb, up to 18 in. high, with a very short raceme of 1–5 deep yellow or orange flowers; in marshes or wet grasslands.

French Sudan: Goruma, Konkobiri (July)! Senegal! French Guineas: Kouria-Bouria (July) Kindia! Timbo (July)! Saborougou near Touba, 2,250 ft. (July)! Sierra Leone: Sendugu (June)! Waterloo! Upper Volta: Kodjar, from Konkobiri to Diapaga (July)! N. Nigeria: Vom, Bauchi Plateau, 3,000–4,500 ft.! Liruven-Kano Hills! around Zungeru and Lokoja! Zungeru (July)! Neill's Valley, near Naraguta (June)! Bauchi Plateau (July)! Mada Hills, 2,000 ft. (June)! Nupe! Also in French Cameroons. Exsicc.—Lécard 204. Pobéguin 1653. Wilford. Burbidge 149. Thomas 692. Collenette 60. Chev. 24403. Dent Young. Carpenter. Lugard. Dalz. 233. Lely 269; P 380. Hepburn 67. Barter 1479. Jacques 131. Caille 15066.

2. *P. megalorrhyncha* Summerhayes in Kew Bull. 1933, 250. A terrestrial somewhat leafy herb 6–12 in. high; in marshes.

S. Nigeria: Fougom, Bamenda Distr., 3,500 ft. (April)! Exsicc.—Maitland 1509.

3. *P. elegantula* Summerhayes, comb. nov. *Habenaria elegantula* Kraenzl. in Engl. Bot. Jahrb. 51: 376. A slender terrestrial herb 5–10 in. high with white or yellow flowers; in grasslands or marshes.

S. Nigeria: Bum, Bamenda Distr., 4,000 ft. (May)! Also in Northern Rhodesia. Exsicc.—Maitland 1443; 1538.

10. *DISA* Berg.—F.T.A. 7: 275.

Dorsal sepal with a long narrow claw, 2–2.5 cm. long, spur pendulous, 5–6 mm. long; petals with an ear-shaped lower part and a narrow twisted upper portion, nearly as long as the dorsal sepal; lip simple, thread-like, 1.5 cm. long; anther erect

1. *erubescens*

Dorsal sepal narrowed at the base but with no distinct claw, 5–10 mm. long:

Spur upright or curved downwards in the upper part only; petals entire; anther horizontal:

Spur upright, slightly swollen at the apex, 6–7 mm. long; slender plant, 20–25 cm. high; inflorescence rather lax, bracts small, 4–7 mm. long; leaves narrowly lanceolate, 3–4 cm. long, up to 8 mm. wide 2. *nigrica*

Spur curved downwards in the upper part, tapering from a broad base, 7–8 mm. long; rather stout plant, 35–50 cm. high; inflorescence dense, bracts large, 1–2 cm. long; leaves linear-lanceolate, 8–13 cm. long, about 1.5 cm. wide

3. *hiricornis*

Spur pendulous from its base; petals bilobed, anterior lobe shorter, ovate or semi-orbicular, posterior lobe upright, narrow, acute or obtuse; anther erect:

Lip with lateral lobes or teeth; sepals about 1 cm. long, dorsal ovate or orbicular, spur 6 mm. long; inflorescence not very dense, 12 cm. long, 3 cm. in diameter

4. *scutellifera*

Lip simple:

Flower spike very dense, 13–30 cm. long, 1.5 cm. in diameter; sepals 5–8 mm. long, spur 7–8.5 mm. long; petals 4–6.5 mm. long, anterior lobe much shorter than posterior, more or less truncate, narrowed towards the base

5. *ochrostachya*

Flower spike rather dense, 10–18 cm. long, 2–3 cm. in diameter; sepals 6–10 mm. long, spur 5–7 mm. long; petals 6–8 mm. long, anterior lobe nearly as long as posterior, semi-orbicular, posterior oblong-lanceolate, acute 6. *subaequalis*

1. *D. erubescens* Rendle—F.T.A. 7: 277. A terrestrial herb 1–3 ft. high; leaves on separate barren shoot, linear, about 1 ft. long; spike about 2–6 in. long, rather lax, 3–10-flowered; flowers flame-coloured, or deep red; on dry grassy slopes.

S. Nigeria: Bamenda, Basenako, 6,000 ft. (June)! Belgian Congo, East Africa from Sudan southward to N.E. Rhodesia and Nyasaland. Exsicc.—Maitland 1503.

2. *D. nigrica* Rolfe in Kew Bull. 1914, 214. A slender terrestrial herb about 8 in. high, with a rather lax inflorescence about 4 in. long of small purple flowers.

N. Nigeria: Ropp, 4,600 ft. (July)! Exsicc.—Nelson 5. Lely 446.

3. *D. hiricornis* Rehb. f.—F.T.A. 7: 283. A slender to rather stout terrestrial herb, 1–2 ft. high, with a dense cylindrical spike 2–6 in. long; flowers purple with darker spots; in damp grassy places.

N. Nigeria: Vom, Bauchi Plateau, 3,000–4,000 ft.! S. Nigeria: Bamenda, Lakom, 6,000 ft. (June)! East to Kenya Colony and Nyasaland, south to Angola and N. Rhodesia. Exsicc.—Maitland 1781. Dent Young.

4. *D. scutellifera* A. Rich.—F.T.A. 7: 278. A rather stout terrestrial herb, 1–2 ft. high, with sheathing lanceolate leaves and a spike of pink flowers; in stony grassland.

S. Nigeria: Bamenda, Bum-Uchan, frequent, 4,000–5,000 ft. (May)! Abyssinia. Exsicc.—Maitland 1788.

5. *D. ochrostachya* Rehb. f.—F.T.A. 7: 279. Erect terrestrial herb, 1–2½ ft. high, with sheathing lanceolate leaves and a long narrow spike of yellow and orange flowers; in grassland.

S. Nigeria: Bamenda, Uchan, 5,000 ft. (April)! Also Kenya, Tanganyika and Angola. Exsicc.—Maitland 1779.

6. *D. subaequalis* Summerhayes in Kew Bull. 1936; ined. An erect terrestrial herb, 1–2½ ft. high, with linear leaves on sterile shoots and sheaths on the scape; flowers pink or purple; in grassland.

N. Nigeria: Vom, Bauchi Plateau, 3,000–4,500 ft.! S. Nigeria: Bamenda, Basenako and Lakom, 5,000–6,000 ft. (June)! Also Uganda and Kenya. Exsicc.—Dent Young. Maitland 1545; 1616. Johnstone.

11. *BROWNLEE* Harv.—F.T.A. 7: 287.

Slender terrestrial herb 20–60 cm. high; leaves 2–3, erect, the lower one 7–22 cm. long, narrowly lanceolate, acute, the upper much smaller but otherwise similar; spike dense, 3–7 cm. long, 1–1.5 cm. in diameter; flowers small, purple; dorsal sepal 3 mm. long, hooded, with a short curved spur; petals united to dorsal sepal,



FIG. 326.—*DISA ERUBESCENS* Rendle (ORCHIDACEAE).

A, inflorescence. B, lower part of scape, and leaves. C, dorsal sepal. D, lateral sepal. E, petal. F, lip.



FIG. 327.—*SATYRIUM LEUCANTHUM* Schltr. (ORCHIDACEAE).

A, base of scape, and leaves. B, inflorescence. C, column (a. anther; r. rostellum; st. stigma). D, pollinium. E, rostellum.

obliquely elliptical; lip very small, entire; anther horizontal; rostellum with 2 large tubercles at base *alpina*

B. alpina *N.E.Br.*—*F.T.A.* 7: 287.

Cameroons Mts., 6,000–8,000 ft. (Sept.–Nov.)! *Exsicc.*—*Mann* 2120. *Johnston* 86. *Preuss* 973.

12. SATYRIUM Sw.—*F.T.A.* 7: 262.

Leaves 2, radical, broadly orbicular, more or less adpressed to the ground, up to 3.5 cm. long and 6 cm. broad; inflorescence short, up to 12-flowered; sepals and petals a little longer than the lip; lip about 1 cm. long, spurs rapidly tapering from a swollen base, shorter than the lip; column bow-shaped; stigma oblong; rostellum middle lobe shovel-shaped, side lobes rounded 1. *leucanthum*

Leaves cauline, or if radical, not orbicular nor adpressed to the ground:

Spurs slender, only slightly tapering from the base, much longer than the lip:

Lip rather fleshy with a narrow opening; leaves on stem sheath-like:

Flowers white; inflorescence rather dense, up to 15 cm. long, lip more or less globose, 5 mm. long, spurs 12–13 mm. long; lateral sepals slightly longer than the lip; dorsal sepal and petals glabrous; middle lobe of rostellum triangular, acute 2. *coriophoroides*

Flowers green; inflorescence rather lax, many-flowered, up to 40 cm. long; lip flattened, ellipsoid, 4.5–6 mm. long, spurs usually about 2 cm. long, but sometimes shorter; lateral sepals about as long as the lip; dorsal sepal and petals densely pubescent; middle lobe of rostellum broadly triangular-oblong with a narrow claw 3. *dizygoceras*

Lip rather membranaceous with a broad opening; leaves on stem narrowly or oblong-lanceolate, acute, up to 30 cm. long and 5 cm. broad; inflorescence rather dense, many-flowered, up to 30 cm. long; flowers rose-pink; lip about 5 mm. long, lateral sepals and petals about the same length; spurs 8–12 mm. long; rostellum middle lobe ovate or orbicular with a narrow claw 4. *crassicaule*

Spurs rather stout, tapering towards the apex, shorter than or at most equalling the lip, 4–6 mm. long; inflorescence dense, up to 15 cm. long, with large often spreading bracts; lip 6–8 mm. long with a rather broad opening; sepals and petals about as long as the lip; rostellum with 3 almost equally long lobes, the middle one retuse or more or less bifid 5. *occulturn*

1. *S. leucanthum* *Schltr.* in *Engl. Bot. Jahrb.* 53: 525. *S. nigericum* *Hutch.* in *Kew Bull.* 1921, 402. A terrestrial herb up to 18 in. high with white or pink-tinged rather waxy flowers; in grassy plains.

N. Nigeria: Vom, Bauchi Plateau, 3,000–4,500 ft. (July)! between Bakuru and Hephem, 4,300 ft. (July)! Also Tanganyika Territory. *Exsicc.*—*Lely* 344; P 398. *Dent Young* 237. *Nelson* 17.

2. *S. coriophoroides* *A. Rich.*—*F.T.A.* 7: 269. A terrestrial herb up to 18 in. high; in grassland.

S. Nigeria: Babanki near Bamenda, 4,500 ft. (April)! Kenya Colony and Abyssinia. *Exsicc.*—*Maitland* 1786.

3. *S. dizygoceras* *Summerhayes* in *Kew Bull.* 1932, 508. A slender terrestrial herb up to 8 ft. high; in grassy plains.

N. Nigeria: Bauchi Plateau (May)! Naraguta, 4,000 ft. (May)! S. Nigeria: Lakom near Bamenda, 6,000 ft. (May)! Kenya Colony. *Exsicc.*—*Lely* 243; P 318. *Maitland* 1366.

4. *S. crassicaule* *Rendle*—*F.T.A.* 7: 271. A terrestrial moderately stout to stout herb up to 3 ft. high; in wet grassy places, marshes or even in water.

S. Nigeria: Uchan near Bamenda, 5,000 ft. (June)! Ruwenzori and Mt. Elgon southwards to L. Nyasa. *Exsicc.*—*Maitland* 1385.

5. *S. occulturn* *Rolfe*—*F.T.A.* 7: 273. *S. Djalonis* *Chev. Bot.* 621. A terrestrial herb up to 2 ft. high with 2–3 elliptical-lanceolate, acute or subacute leaves on the stem and white flowers; bracts of inflorescence often spreading far beyond the flowers; in marshes and wet places.

French Guinea: Dalaba-Diaguissa, 3,000–4,000 ft. (Oct.)! S. Nigeria: Bum, near Bamenda, 4,000 ft. (June)! Nyasaland, N. Rhodesia and Angola. *Exsicc.*—*Maitland* 1575. *Chev.* 18814.

13. DISPERIS Sw.—*F.T.A.* 7: 288.

Leaves 1–3, alternate, sessile; hood formed by dorsal sepal and petals broad and shallow:

Petals cordate at the base:

Leaves and bracts very small, narrowly ovate or lanceolate, up to 6 mm. long; hood about 6 mm. long, more or less erect; lateral sepals united in the lower third, semi-ovate, 1 cm. long, bluntly acuminate; lip 6 mm. long, with a narrow claw, lamina at apex transversely elliptical, somewhat emarginate and bearing a narrow keel in the lower part, the claw bearing just above the level of the anther 2 elliptical-oblong appendages placed transversely one on each side 1. *togoensis*

Leaves and bracts much larger, very similar to one another, broadly or narrowly ovate, cordate at the base, up to 18 mm. long and 12 mm. wide; hood 8 mm. long, a little bent forwards; lateral sepals united in the lower quarter, 8.5 mm. long, apices turned outwards; lip 5 mm. long, claw narrow, lamina orbicular with a tall narrow keel in the lower centre, appendages on claw elliptical-oblong, diverging from one another at an acute angle 2. *cardiopetala*

Petals narrowed at the base, not cordate; hood 9 mm. long, much bent forward, more or less rounded at the apex; lateral sepals 1 cm. long, united in lower third, semi-elliptical, apices rather obtuse; lip 5.5 mm. long, claw narrow, lamina ovate with high keel in centre of lower part, appendages linear-oblong; leaves orbicular-

- ovate, elliptical-ovate or lanceolate, cordate at the base, up to 2.5 cm. long and 1.5 cm. broad; bracts much smaller, lanceolate 3. *Johnstoni*
- Leaves 2, opposite, broadly ovate, acute, cordate at the base; hood formed by dorsal sepal and petals narrowly cylindrical, 1-1.6 cm. long; petals bilobed on the front margin, posterior or lower lobe rounded:
- Anterior or upper petal-lobes aristate-acuminate, projecting from front of hood like two horns about 4 mm. long; limb of lip terminating above the column in a small knob, the erect linear appendage 7 mm. long arising from just below the apex, passing upwards into the hood and there suddenly bent downwards as two tongue-shaped lobes 3.5 mm. long; hood about 1.5 cm. long 4. *Mildbraedii*
- Anterior or upper petal-lobes triangular, acute, 2 mm. long; limb of lip linear, erect, passing upwards into the hood for about 4.5 mm., at the end bent downwards and broadened into a lanceolate blade about 2.5 mm. long, bearing a short papillose tooth-like appendage on the upper surface; hood about 1 cm. long 5. *kamerunensis*

1. *D. togoensis* Schltr. in Engl. Bot. Jahrb. 38: 2. A dwarf slender terrestrial herb about 4 in. high with a short raceme of about 3 rose-coloured flowers; among rocks.
Togo: Mt. Agome, near Ashanti-Kpoeta (March)! Exsicc.—Schlechter 12990.
2. *D. cardiopetala* Summerhayes in Hook. Ic. Pl. t. 3270. *D. cordata* Summerhayes, not of Sw. *D. atacorensis* Chev. Bot. 622. A dwarf leafy terrestrial herb 2-5 in. high with 2-6 flowers in a short raceme; in and at edges of forest.
Dahomey: Atacora Mts., Forfa (June)! S. Nigeria: Bamenda District, Bum, 4,000 ft. (April)! Exsicc.—Maitland 1519. Chev. 24039; 24060.
3. *D. Johnstoni* Rehb. f.—F.T.A. 7: 291. A slender terrestrial herb 4-5 in. high; leaves purple on the undersurface; flowers 2-3 in a short terminal raceme, pale mauve and white; under rocks.
N. Nigeria: Naraguta (Aug.)! Also Kilimanjaro. Exsicc.—Lely 485.
4. *D. Mildbraedii* Schltr. in Wiss. Ergeb. Deutsch. Zentr.-Afr.-Exped. 1910-11, 2: 180, name only; *Summerhayes* in Kew Bull. 1933, 253, description. A slender terrestrial herb 6-7 in. high with 1-3 white flowers at the apex; in mountain forest.
Fernando Po: Sta. Isabel Mt., above Basilé, 3,700-4,700 ft. (Aug.)! Exsicc.—Mildbraed 6312.
5. *D. kamerunensis* Schltr.—F.T.A. 7: 575. *D. Preussii* Rolfe, l.c. 291. A terrestrial herb, 4-8 in. high, with 1-3 flowers.
Cameroons Mt.: above Buea, 3,600-3,900 ft. (Sept.)! Exsicc.—Preuss 609.

14. VANILLA Sw.—F.T.A. 7: 176.

Sepals and petals 2-3 cm. long; outgrowths on lip composed of several thin flat overlapping cuneate jagged scales:

Leaves oblong-lanceolate or oblong-elliptical, acuminate, rounded at the base, up to 12 cm. long and 2.5 cm. wide; sepals and petals 2-2.5 cm. long; lip united to column for three-quarters of length of latter forming a wide tube; side lobes broadly rounded, projecting forward from the point of union with, and front margin approximately at right angles to, the column; total length of lip 2 cm., crest at base of middle lobe composed of 4-5 scales, below this a rough narrow keel to the base of the lip; column 1.6 cm. long, slightly incurved 1. *africana*

Leaves elliptical or oblong-elliptical, shortly acuminate or broadly apiculate, rounded at the base, up to 19 cm. long and 7 cm. wide; sepals and petals 2-3 cm. long; lip united to column for two-thirds of length of latter, forming a wide tube; front margin of side lobes forming a backwardly directed acute angle with the column, edges somewhat reflexed, both side and front lobes somewhat crenulate; crest composed of 4-5 scales, 2-4 mm. long, a raised smooth keel running from this towards the base of the lip:

Inflorescences many-flowered, often branched at the base; bracts very small, triangular, never leaf-like; lip 1.4-1.6 cm. long, front lobe 6-7 mm. wide; column 1.3-1.5 cm. long 2. *ramosa*

Inflorescences many-flowered, always simple; upper bracts small, triangular, lower ones often leaf-like, orbicular or elliptical, apiculate or shortly acuminate, up to 5 cm. long and 3.5 cm. wide, or the inflorescence-branch bearing small leaves below the flowers; lip 1.5-2 cm. long, front lobe 7-11 mm. wide; column 1.8-2.3 cm. long 3. *crenulata*

Sepals and petals 3-5 cm. or more long; outgrowths on lip consisting of hair-like structures:

Bracts of inflorescence small, 4 mm. long; sepals and petals 3.5-4 cm. long, white; tube formed by lip and column broad; leaves narrowly oblong-lanceolate, bluntly acuminate, 15-25 cm. long, 3.5-4.5 cm. broad; inflorescence up to 6 cm. long, 4-5-flowered; lip united to column for 1.2 cm., 3 cm. long, margins crenulate, coarsely hairy near the mouth 4. *nigrica*

Bracts of inflorescence ovate, imbricating, 2-3 cm. long; sepals and petals 7-8 cm. long, yellow; tube formed by lip and column narrow and cylindrical at the base, much widened above, blotched with purple or rose; leaves elliptical or oblong-obovate, shortly but broadly apiculate, 12-20 cm. long, 5-12 cm. broad; inflorescence up to 15 cm. long, densely many-flowered; lip united to column nearly to anther, 6 cm. long, obscurely trilobed, side lobes broadly rounded enveloping the apex of the column, middle lobe acute, front margin of lip very crenulate and folded; callus

in centre of lip consisting of a dense tuft of fine hairs, tube of flower hairy inside, middle lobe of lip with thicker long papillae especially at extreme apex 5. *imperialis*

1. *V. africana* Lindl.—F.T.A. 7: 176. A high climbing herb with short racemes of fragrant white flowers with purplish markings on the lip; in rain forest.
Liberia: Peahntah (Oct.)! Sinoe Basin! Gold Coast: Aburi (Sept.)! Aknopong Hills, 1,500 ft. (Oct.)! S. Nigeria: Brass River! Mt. John, Kongui River (Sept.)! Exsicc.—Linder 1108. Johnson 789; 859. Whyte. Barter 47. Mann 1881.
2. *V. ramosa* Rolfe—F.T.A. 7: 177. *V. ovalifolia* Rolfe. A fleshy climbing herb.
S. Nigeria: Sapoba! Oban! Western Lagos! Angiama! Old Calabar! Also Spanish Guinea and Belgian Congo. Exsicc.—Kennedy 220; 2081. Talbot. Rowland. Barter 20134. Thomson 132.
3. *V. crenulata* Rolfe—F.T.A. 7: 178. *V. crenata* Chev. Bot. 624. A fleshy herb climbing over forest trees with long hanging racemes of white flowers with purple markings on the lip; in rain forest.
Sierra Leone: Bo (March)! Robis to Kolnadugu (March)! Bumban to Lokko (April)! S. Province, 200–500 ft. (March)! Liberia: Sinoe Basin. Du River (July)! Mt. Barclay (May)! Ivory Coast: Oghoville (Nov.)! Man (Sept.–Oct.)! Attié (March)! Gold Coast: Prahú Assin (Jan.)! Aburi (Feb.)! Central Province, Tamfa to Bansa (April)! Oda (Oct.)! Akim Begoro (April)! Kumasi, 1,000 ft. (Aug.)! S. Nigeria: W. Province, Aguna (Dec.)! Also Princes I. Exsicc.—Thomas 3432. Dave 439. Sc. Elliot



FIG. 328.—*VANILLA CRENULATA* Rolfe (ORCHIDACEAE).

A, flowering shoot. B, leaf. C, column and lip. D, fruit.

5733. Linder 46; 47. Bunting. Whyte. Chev. 17504; 22383; 34171. Cumming 4. Johnson 230. Ktson 1036. Fishlock 57. Irvine 1186. Miles. Vigne 3062. Deighton 2496; 2963. (See Appendix).
4. *V. nigerica* Rendle in Cat. Tab. Nig. Pl. 108. A fleshy climbing herb; flowers white with rosy markings on the lip.
S. Nigeria: Oban! Also Cameroons. Exsicc.—Talbot. 776.
 5. *V. imperialis* Kraenzl.—F.T.A. 7: 178. A fleshy climbing herb with thick stems and dense racemes of large yellow flowers with purple or rose markings on the lip.
Gold Coast: Ashanti, Mfrim, 1,500 ft. (Aug.)! Cameroons, Uganda, ? Belgian Congo. Exsicc.—Vigne 2412.

15. *NERVELIA* Gaud.—F.T.A. 7: 186, as *Pogonia* Juss.

Inflorescence 1-flowered:

Lip approximately wedge-shaped, 8–18 mm. long, apex trilobed; middle lobe with nerves bearing numerous thread-like outgrowths in the upper part; sepals and petals very similar, linear-ligulate, subacute, 8–19 mm. long; column almost straight, winged near the apex, 6–7 mm. long 1. *Afzelii*

Lip distinctly trilobed below the middle, about 13–15 mm. long, side lobes enveloping the column and about the same length, free ends triangular, subacute, about 1 mm. long; middle lobe much larger, elliptical, slightly retuse or apiculate at the apex, about 6 mm. broad, with 2 keels at the base running up as papillose veins nearly to the apex; sepals and petals linear, subacute, about 18 mm. long; column narrow at base, much thickened at apex, 5–6 mm. long . . . 2. *Fuerstenbergiana*

Inflorescence 2–4-flowered; lip trilobed in upper half, side lobes short, acutely obtuse, middle lobe larger, triangular, disk with 2 longitudinal keels extending to the base of the middle lobe and a thickened vein between:

Inflorescence 10–25 cm. high, rather slender; tubers spherical, 1–1.5 cm. diameter; sepals ligulate, acute, 11–19 mm. long; petals similar, but relatively broader, 9–17 mm. long; lip 10–19 mm. long, side lobes 1–2 mm. broad, middle lobe 4–6 mm. long 3. *purpurata*

Inflorescence 20–40 cm. high, rather stout; tubers 1.5–2.5 cm. in diameter; leaves ovate-orbicular, longly apiculate, deeply cordate at the base, with long petioles, lamina when full-grown 10–15 cm. long, 12–17 cm. broad, mature petiole 17–22 cm. long; sepals ligulate, obtuse, 2.3–4 cm. long; petals similar but a little shorter; lip 2.5–4 cm. long, side lobes 3–6 mm. wide, middle lobe 7.5–10 mm. long, 9–15 mm. wide 4. *shirensis*

1. *N. Afzelii* Schltr. in Engl. Bot. Jahrb. 45: 402. *Pogonia Thouarsii* Rolfe in F.T.A. 7: 187, not of Bl. A small terrestrial orchid about 2–3 in. high, with a single flower and small reniform leaf, purple underneath; flowers $\frac{3}{4}$ in. long.
Sierra Leone! S. Nigeria: Bum, Bamenda Distr., 4,000 ft. (May)! Uganda. Exsicc.—*Afzelius*. Maitland 1528.
Var. *grandiflora* Summerhayes in Kew Bull. 1936, ined. *Pogonia Fineti* Chev. Bot. 620. Flowers $\frac{1}{2}$ in. long.
French Guinea: Faranna (May)! Exsicc.—Chev. 13406.
2. *N. Fuerstenbergiana* Schltr. in Fedde, Repert. Nov. Sp. 9: 330. A small terrestrial orchid 2–5 in. high, with a single white flower with reddish markings on the lip.
Sierra Leone: S. Kambui Hills, 760 ft. (March)! Also in French Cameroons. Exsicc.—*Dawe* 451.
3. *N. purpurata* Schltr. in Warb. Kun.-Samb. Exped. 210. A slender terrestrial herb 4–10 in. high, with a short raceme of 2–4 pale olive green flowers with purple veins on the lip; leaf broadly ovate, long-petioled, lamina 3–5 in. long.
N. Nigeria: Zelau, 3,200 ft. (April)! Tropical Africa and Transvaal. Exsicc.—*Lely* 117.
4. *N. shirensis* Schltr. in Engl. Bot. Jahrb. 45: 403. *Pogonia shirensis* Rolfe in F.T.A. 7: 187. *P. umbrosa* Rolfe l.c. 186, in part, not of Rehb. f.; Chev. Bot. 620. A terrestrial herb 8–16 in. high, with 2–3 greenish-white flowers with purplish-red veins on the lip.
French Guinea: Dalaba! Diaguissa, 4,000 ft. (April)! Sierra Leone: Falaba (March)! Togoland: Kewe (March)! N. Nigeria: Abinsi, leaves only (June)! Zelau, 3,200 ft. (April)! Nupe, leaves only! Also Chari Territory, S. Tanganyika Territory and Nyasaland. Exsicc.—*Caville* in Chev. 18146. *Sc. Elliot* 5119. *Schlechter* 12947. *Dalz.* 843. *Lely* 117a. *Barter* 1540. *Chev.* 12851.

16. EPIPOGIUM Gmel.—F.T.A. 7: 188.

Saprophytic leafless terrestrial herb up to 45 cm. high; tuber ovoid, up to 4 cm. long and 2.5 cm. in diameter; scape erect, rather fleshy, with numerous blunt loosely sheathing scales in the lower part; raceme up to 25-flowered, 3–12 cm. long; flowers usually pendulous, whitish with small purplish or pink spots; sepals and petals narrow, acute, nearly 1 cm. long; lip entire, narrowly ovate, with the cordate base enveloping the column, acute, about 1 cm. long, with 2 lines of short hairs running from the base to the apex, the latter somewhat thickened; column with swollen stigmatic lobes at the base, and much thickened at the apex *roseum*

- E. roseum* Lindl. in Journ. Linn. Soc. 1: 177. *E. nutans* Rehb. f.—F.T.A. 7: 188.
S. Nigeria: Ambas Bay (Feb.)! Cameroons Mt.: Moliwe near Buea (Feb.)! Fernando Po, 4,000–5,000 ft. (Jan.)! Also in Angola, Uganda, Indo-Malaya, Australia and New Hebrides. Exsicc.—*Mann* 784. *Dalz.* 8205. *Ezell* 795.

17. AUXOPUS Schltr. in Engl. Bot. Jahrb. 38: 3.

Terrestrial, saprophytic, leafless; tuber cylindrical or globose, 6 mm. in diameter; stem very slender, rather weak and flexuous, up to 25 cm. high, with a few very small sheathing scales; raceme short, up to 20-flowered; flowers very shortly stalked, about 2–3 mm. long; sepals and petals united in the lower part, oblong-lanceolate; lip with a narrow claw and an orbicular or obovate limb; capsules on much elongated pedicels, about 1 cm. long *kamerunensis*

- A. kamerunensis* Schltr. l.c. 4; Cat. Talb. Nig. Pl. 147. In forests, flowers brownish.
Ivory Coast: between Adzopé and Boudepé (Dec.)! N. Nigeria: Nupe! S. Nigeria: Oban Distr.! Also French Cameroons. Exsicc.—*Barter*. *Talbot* 1450. *Chev.* 22681.
Var. *grandiflora* Summerhayes in Kew Bull. 1936, ined. Flowers 6–7 mm. long, structure as in type.
Ivory Coast: Makougnie (Jan.)! Exsicc.—*Chev.* 17025.

18. MANNIELLA Rehb. f.—F.T.A. 7: 185.

Terrestrial herb 50–90 cm. high; leaves radical, long stalked, lamina obliquely ovate, shortly acuminate, 4.5–16 cm. long, 2.5–7 cm. wide, green with white spots, petiole somewhat sheathing at the base, 6–14 cm. long; scape slender, erect, with a few large membranous sheaths; spike slender, many-flowered, rather lax, 15–40 cm. long; flowers small, suberect, brownish or pink; sepals 6 mm. long *Gustavi*

- M. Gustavi* Rehb. f.—F.T.A. 7: 185; Cat. Talb. Nig. Pl. 147.
Gold Coast: Tumfa near Akim (Dec.)! S. Nigeria: Owby, Cross River! Oban! Cameroons Mt., 4,000 ft. (Jan.)! St. Thomas, French Cameroons and Uganda. Exsicc.—*Johnson* 274. *Holland* 194. *Talb.* 1339. *Mann* 1336.

19. PLATYLEPIS A. Rich.—F.T.A. 7: 184.

Terrestrial herb, 15–50 cm. high; stem creeping at base, bearing many tomentose roots; leaves in a tuft on the lower part of the stem, petiolate, lamina obliquely elliptical, shortly acuminate, 4–17 cm. long, 2–5.5 cm. wide, petiole sheath-like below, 4–9 cm. long; scape with several sheaths; raceme densely many-flowered, 5–10 cm. long, bracts broad, glandular-pilose; flowers white; sepals and petals 8–9 mm. long; lip united to the column for half its length, 7 mm. long, with a short broad

reflexed lobe at the apex, 2 narrow calli in the upper part, and forming at the base 2 short outwardly directed spurs; rostellum about equalling the lip; anther acuminate *glandulosa*

- P. glandulosa* *Rehb. f.*—F.T.A. 7: 184. *P. Talbotii* Rendle, Cat. Talb. Nig. Pl. 109. French Guinea: between Ditiani and Dalaba (Sept.)! Ivory Coast: Soubré to Péturi (June)! Gold Coast (Dec.)! S. Nigeria: Oban! Fernando Po, 2,000 ft.! Also Princes I. and Uganda. Exsicc.—Johnson 1072. *Talb.* 1468. *Mann* 1481. *Chev.* 18524; 18542; 19185.

20. CHEIROSTYLIS Blume—F.T.A. 7: 182.

Terrestrial herb, 10–30 cm. high; stem creeping at base and rooting; leaves rather tufted, stalked, and with a sheathing base, lamina ovate, shortly acuminate, rounded at the base, 1.5–4 cm. long, 1–2.5 cm. wide, stalk somewhat shorter than the lamina; scape with a few acuminate sheaths, shortly hairy; raceme dense, 1.5–4 cm. long, up to 20-flowered; flowers white; sepals and petals 3 mm. long; lip 4 mm. long, with a narrow claw bearing 2 small calli at the base and 2 broad almost oblong divergent lobes at the apex *lepida*

- C. lepida* *Rolfe*—F.T.A. 7: 182; Cat. Talb. Nig. Pl. 147. Sierra Leone: Sugarloaf Mt. (Dec.)! S. Nigeria: Oban! Cameroons Mt., 3,000–6,000 ft. (Nov.–Jan.)! St. Thomas, Belgian Congo and Tanganyika Territory. Exsicc.—*Sc. Elliot* 4027. *Mann* 2180. *Schlechter* 12845. *Dunlap* 95. *Maitland* 899. *Talb.* 870.

21. ZEUXINA Lindl.—F.T.A. 7: 180.

Plant 15–45 cm. high; lower part of stem decumbent, rooting, upper part erect; leaves in a bunch at the base of the erect part, shortly stalked from a sheathing base, lamina lanceolate-ovate or lanceolate, acute, rounded at the base, up to 7 cm. long and 3 cm. wide, petiole and sheath 1–2.5 cm. long; raceme slender, rather laxly many-flowered, 6–12 cm. long; flowers small, green and white; sepals and petals 2–3 mm. long; lip the same length, with a concave claw below bearing 2 hooked calli at the base, and a transversely elliptical or semi-orbicular lamina at the apex

1. *elongata*
Plant 8–18 cm. high, very shortly decumbent at the base, otherwise erect; leaves all up the stem, linear, acute, somewhat sheathing at the base, 1–3.5 cm. long, 2–4 mm. wide; spike short, 1–2.5 cm. long, densely up to 20-flowered; sepals and petals about 2.5 mm. long; lip the same length, more or less oblong, somewhat cordate at the base, narrowed towards the apex, obtuse, the margins incurved and more or less erose, the whole surface strongly papillose 2. *africana*

1. *Z. elongata* *Rolfe*—F.T.A. 7: 181; Cat. Talb. Nig. Pl. 147. Sierra Leone: Talla Distr., Lomaburn (Feb.)! S. Nigeria: Oban! Also Princes I., Cameroons, Belgian Congo. Exsicc.—*Sc. Elliot* 5020. *Talb.* 1360; 2408.
2. *Z. africana* *Rehb. f.*—F.T.A. 7: 181. *Z. cochlearis* Schltr. N. Nigeria: Sokoto (Jan.)! Also Angola and Natal. Exsicc.—*Dalziel* 447.

22. HETAERIA Bl.—F.T.A. 7: 183.

Lip inferior; raceme 1–6 cm. long, rather densely 3–20-flowered; plant up to 20 cm. high; leaves aggregated in middle of stem; lamina lanceolate, acute, rounded or subcordate at the base, 1.5–4.5 cm. long, 6–14 mm. wide; petiole and sheath 7–12 mm. long; dorsal sepal and petals 3–5 mm. long, lateral sepals a little shorter; lip 5 mm. long with a concave claw with 2 hooked calli at the base and 2 obovate divergent lobes at the apex 1. *heterosepala*

Lip superior; raceme 3–15 cm. long, many-flowered:

Lamina of lip entire, quadrate or somewhat diamond-shaped with the long axis transverse, claw furnished just below lamina with a thickened incurved wing on each side and with a series of hooked calli on each side at the base; outgrowths on face of column united inwards so as to form a pouch below the rostellum; plant 25–35 cm. high, leaves 3–6 in the middle of the stem, lamina obliquely oblong-ovate, shortly acuminate, 3–6.5 cm. long, 1–3 cm. wide, petiole and sheath 1.5–2 cm. long; raceme 3–8 cm. long, dense; sepals and petals 3–4 mm. long; lip 2.5–3 mm. long

2. *Stammeri*
Lamina of lip divaricately bilobed, lobes narrowest at base, claw unthickened below lamina; outgrowths on face of column free from one another; leaves all along upper part of stem, lamina over 3 cm. long, petiole and sheath over 1.5 cm. long; raceme rather lax, 5–18 cm. long;

Rostellum longer than the column, 2.5–3 mm. long; leaves obliquely elliptical-ovate or ovate, 3–10 cm. long, 1.5–4 cm. wide; inflorescence 5–11 cm. long; sepals 5–6.5 mm. long; lip 6 mm. long (to apex of middle lobe or central apiculus), lateral lobes 4–5 mm. long, 1.6–2 mm. wide 3. *tetraptera*
Rostellum equalling or shorter than the column, 0.9–1.2 mm. long; lobes of lip 1.5–4 mm. long;

Lobes of lip reflexed, oblong or narrowly oblanceolate, obtuse, 1.5 mm. long, base of lip forming indistinct spurs; sepals 3–4 mm. long; arms of rostellum 0.9 mm.

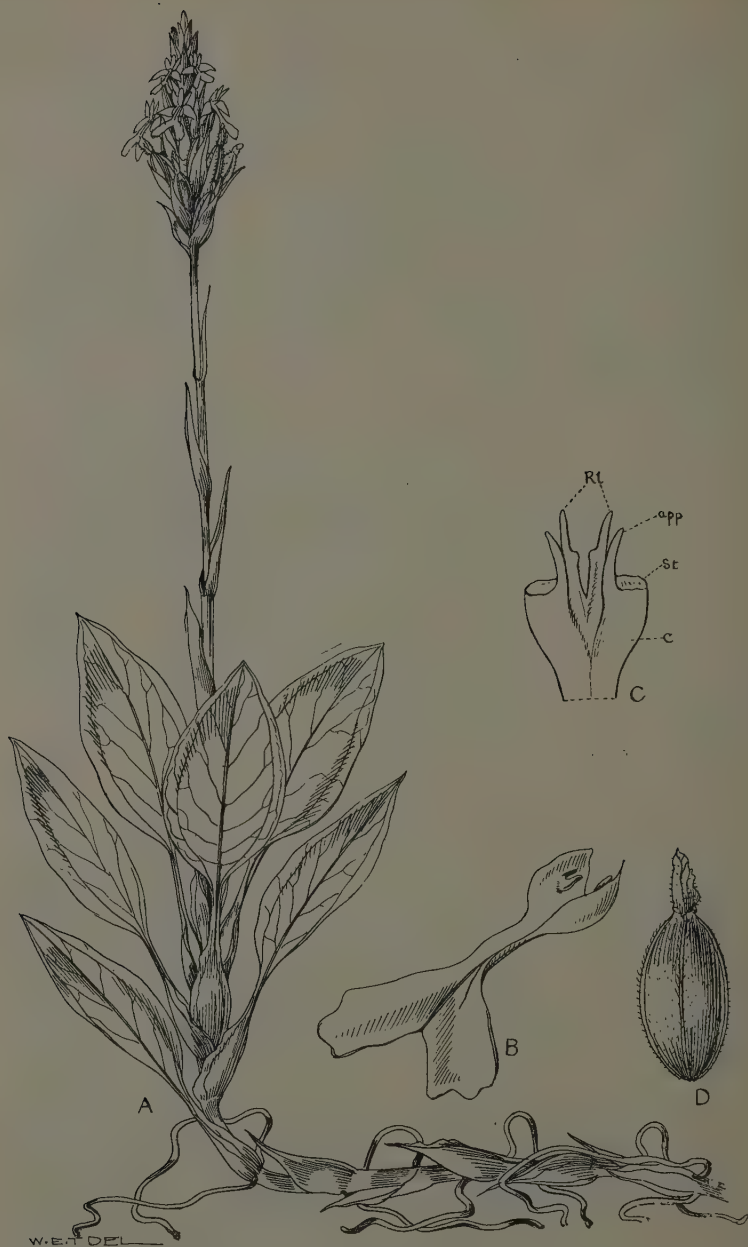


FIG. 329.—*CHEIROSTYLIS LEPIDA* Rolfe (ORCHIDACEAE).

A, flowering plant. B, lip. C, column (st. stigma; app. appendage; rl. rostellum-lobes). D, capsule.

long; plant 45 cm. high; leaves obliquely lanceolate, lamina 7–11 cm. long, 2–3.5 cm. wide 4. *Mannii*
 Lobes of lip spreading, broadly cuneate from a narrow base, rounded at apex, 3–4 mm. long, 2.5–3 mm. wide, base of lip forming 2 short but distinct obtuse spurs; sepals 4–6.5 mm. long; arms of rostellum 1.2 mm. long; plant 30–60 cm. high; leaves obliquely lanceolate or elliptical-lanceolate, lamina 6–16 cm. long, 2–5 cm. wide 5. *occidentalis*

1. *H. heterosepala* Summerhayes in Kew Bull. 1934, 207. *Cheirostylis heterosepala* Rehb. f.—F.T.A. 7: 183. *Zeuxina commelinoides* Chev. Bot. 619. Ivory Coast: Cavally Basin, Grabo (July)! Cameroons Mt., 3,000 ft. (Nov.)! St. Thomas, Belgian Congo. Exsicc.—Mann 2130. Chev. 19614.
2. *H. Stammleri* Summerhayes in Kew Bull. 1934, 208. *Zeuxina Stammleri* Schltr.; Cat. Talb. Nig. Pl. 147. Ivory Coast: Assikasso (Dec.)! S. Nigeria: Ijebu, Shasha Forest (Feb.)! Oban! Tiko, British Cameroons (Jan.)! Moliwe! Princes I. Exsicc.—Stammler, Dunlap 245. Talb. 922; 1364. Chev. 25601. Richards 3072.
3. *H. tetraptera* Summerhayes l.c. 207. *Zeuxina tetraptera* Dur. and Schinz—F.T.A. 7: 181. *Z. Batesii* Rolfe. Flowers green and white. S. Nigeria: Ijebu, Baba Eko (May)! Also Cameroons and Gaboon. Exsicc.—Ross 234.
4. *H. Mannii* Benth.—F.T.A. 7: 184. S. Nigeria: Cameroons River (Jan.)! Exsicc.—Mann 2131.
5. *H. occidentalis* Summerhayes in Kew Bull. 1934, 206. *Zeuxina elongata* Chev. Bot. 619. *Z. Batesii*, Cat. Talb. Nig. Pl. 147, not of Rolfe. French Guinea: Faranna Distr., Mangata (Jan.)! Ivory Coast: Macoupué (Jan.)! Gold Coast: Akim, Kibbi (Dec.)! N. Nigeria: Kontagora (Jan.)! S. Nigeria: Oban! Iloro (Sept.)! Exsicc.—Chev. 16999; 20424. Johnson 592. Dalz. 231. PUNCH. Talb. 920; 921.

23. CORYMBORCHIS Thou.—F.T.A. 7: 179.

Terrestrial erect herb; leaves with a narrow sheathing base and a short petiole; lamina 15–30 cm. long, 3.5–8.5 cm. wide, many-veined; inflorescences up to 7 cm. long, up to 20-flowered, bracts small; flowers erect; perianth-segments 5–7 cm. long, broadened near the apex; column long and slender, partially enveloped by the lip *Welwitschii*

- C. *Welwitschii* Rehb. f.—F.T.A. 7: 180; Chev. Bot. 624. In forests; flowers white or greenish. Sierra Leone: Freetown (Aug.)! Ivory Coast: Guidéko (March-May)! Gold Coast: Kibbi Hills, Akim (Dec.)! Fernando Po: (June)! generally distributed in Tropical Africa. Exsicc.—Burbidge 521, Farmer 580. Johnson 272. Barter 1478. Mann 430. Chev. 19014.

24. MALAXIS Soland. ex Sw.—F.T.A. 7: 17, as *Microstylis* Nutt.

Flowers close together at the apex of the inflorescence, forming a false umbel; petals almost as wide as sepals; margin of lip denticulate:

- Lip bearing 2 parallel calli at the base with a needle-like projecting point just in front on the median vein; sepals and petals 5–6 mm. long, the latter denticulate; lip transversely elliptical, emarginate at the apex, 3.5–4.5 mm. broad; stems 4–5 cm. high, 3-leaved; leaves ovate, 4–7 cm. long, 2.5–5 cm. broad 1. *Maclaudii*
 Lip bearing a single oblong entire callus at the base; sepals and petals 2.5–3 mm. long, all entire; lip quadrate-cuneate, emarginate at apex, basal margins much thickened, 3 mm. long, 2.5–3 mm. broad; stems 2.5–5 cm. high, 3-leaved; leaves narrowly ovate, 4–5.5 cm. long, 1.5–3 cm. broad 2. *Chevalieri*
 Flowers in an elongated raceme or spike; petals much narrower than sepals; margin of lip entire:
 Lip broader towards the apex, with a single central pubescent cushion at the base, auricles at base rather acute; sepals and petals 1.5–2 mm. long; column very short (0.3 mm. long), anther horizontal; stems 3–6 cm. high, 2–4-leaved; leaves ovate, 1–6 cm. long, 1–3 cm. broad 3. *prorrepens*
 Lip broader towards the base or oblong, with 2 lateral pubescent cushions, auricles at base rounded:
 Lip oblong, longer than broad, with small rounded purple auricles, otherwise pale yellowish, 3.5 mm. long (auricles included); sepals and petals 3 mm. long; column 0.8 mm. long; stems 3–8 cm. high, 4–5-leaved; leaves lanceolate or broadly lanceolate, 2–5 cm. long, 1–2 cm. broad 4. *melanotoessa*
 Lip more or less quadrate, broader than long, narrowed at the front, auricles large, almost forming distinct side lobes, lip 2.8 mm. long (auricles included); sepals and petals about 4 mm. long; column 1.6 mm. long; stems 10–12 cm. high, 3-leaved; leaves ovate, 3–5 cm. long, 1–2.5 cm. broad 5. *Weberbaueriana*

1. *M. Maclaudii* Summerhayes in Kew Bull. 1934, 208. *Microstylis Maclaudii* Finet. Flowers flesh- or wine-coloured. French Guinea: Songoya. Eastern Sudan. Exsicc.—Maclaud 81.
2. *M. Chevalieri* Summerhayes in Kew Bull. 1934, 208. *Liparis Sassandrae* Chev. Bot. 613, name only. Ivory Coast: valley of the middle Sassandra River, near Touana (May)! Exsicc.—Chev. 21786.
3. *M. prorrepens* Summerhayes in Kew Bull. 1934, 208. *Microstylis prorrepens* Kraenzl. French Guinea: Kindia! Sierra Leone: Sugarloaf Mt. (June)! Exsicc.—Preuss. Jacques 135.
4. *M. melanotoessa* Summerhayes in Kew Bull. 1934, 209. Liberia: Gola Forest, S. of Ba (May)! Exsicc.—Bunting.
5. *M. Weberbaueriana* Summerhayes in Kew Bull. 1934, 208. *Liparis Weberbaueriana* Kraenzl. Cameroons Mt.! Exsicc.—Weberbauer 42.

25. *LIPARIS* Rich.—F.T.A. 7 : 19.

Stems swollen at the base to form an almost globose pseudobulb ; stem 1.5–2 cm. long ; leaves ovate, almost sessile, in a tuft at the base, 2–4 cm. long, 1–3 cm. broad ; scape erect, 7–11 cm. long, flowering nearly to the base ; fruit ellipsoid, 6–8 mm. long, long, about 4 mm. in diameter ; flowers unknown 1. *kamerunensis*

Stems not or only slightly swollen at the base :

Lip distinctly 3-lobed, about 4 mm. long, side lobes shortly triangular, middle lobe long and narrow, the margins inrolled so as to make it appear subulate, sharply inflexed at the middle, 2.5–3 mm. long, lip bearing a short bilobed callus at the base ; leaves in a tuft at the base, narrowly oblong-oblancoelate, acute, up to 6 cm. long and 1.7 cm. wide ; inflorescence overtopping the leaves, many-flowered, bracts rather large

2. *tridens*

Lip bilobed, or if trilobed the middle lobe reduced to an apiculus, the side lobes much larger and rounded :

Stem long and slender, lower part creeping and rooting, upper part erect, leafy ; leaves with short sheathing base and rather long petiole, lamina ovate or lanceolate-ovate, cordate or rounded at the base, 1–4 cm. long, 1–2 cm. broad ; inflorescence about 4 cm. long, several-flowered ; sepals and petals about 5 mm. long, the lateral sepals united shortly at the base ; lip transversely oblong, about 4 mm. long and 7 mm. wide, side lobes almost orbicular, front lobe triangular, much smaller, lip with a large tooth at the base 3. *goodyeroides*

Stem short, consisting of a sympodial series of upright shoots close together, the shoots sometimes slightly thickened to form a pseudobulb :

Petals almost twice as long as the dorsal sepal ; leaves ovate or lanceolate, up to 2.7 cm. long, 7 mm. broad ; pseudobulbs 12–20 mm. long, 2–4-leaved ; inflorescence sharply 2–4-winged, up to 14–18 cm. long, many-flowered ; lower flowers aborted with only 4 linear segments ; fertile flowers, dorsal sepal 5–8 mm. long, petals linear, 8–13 mm. long ; lip obovate or oblong from a cuneate base, 5 mm. long, bilobed, lobes rounded 4. *Cailliei*

Petals equal to or only slightly longer than the dorsal sepal ; leaves lanceolate or lanceolate-ovate, over 3 cm. long and usually at least 3 times as long as wide :

Inflorescence shorter than or scarcely overtopping the leaves ; flowers large, lip over 1 cm. wide, transversely elliptical :

Lip about 7 mm. long and 10–11 mm. broad, callus at base 2–3-lobed, auricles as long as broad ; leaves oblong-lanceolate, base of lamina gradually tapering into petiole, total length up to 13 cm., and to 1.7 cm. broad ; stem slightly thickened at base ; sepals 8–10 mm. long ; petals narrower, 11 mm. long 5. *Winkleri*

Lip 11–12 mm. long, 16 mm. broad, callus at base consisting of a stout upright entire tooth, auricles rounded, much broader than long ; leaves lanceolate or elliptical-lanceolate, shortly acuminate, base of lamina suddenly contracted into the petiole, total length up to 11 cm., up to 4 cm. broad, texture very thin ; stem hardly thickened at base ; sepals 10–12 mm. long ; petals very narrow, 13 mm. long, 0.5 mm. broad 6. *platyglossa*

Inflorescence usually much overtopping the leaves, many-flowered ; flowers rather small, lip under 7 mm. broad, suborbicular, elliptical, obcordate or obcordate-flabellate, with 2 small teeth or calli at the base :

Terrestrial plants ; inflorescences 15–50 cm. high ; lamina of leaves 5–25 cm. long, 1.3–8.5 cm. broad ; lip obcordately bilobed, somewhat recurved, 2.5–4 mm. long, 2.5–4.5 mm. broad, lobes rounded ; sepals 4–6 mm. long ; petals narrower, 4.5–5.5 mm. long :

Leaves narrowly lanceolate with short petiole, 7–25 cm. long, 1.3–5 cm. broad, usually less than half the height of the inflorescence ; lip rather fleshy ; stem distinctly swollen at the base 7. *rufina*

Leaves elliptical or lanceolate-elliptical with a long petiole, 5–18 cm. long, 2–8.5 cm. broad, usually more than half the height of the inflorescence ; lip thin in texture ; stem hardly swollen at the base 8. *guineensis*

Epiphytic plants ; inflorescences 5–13 cm. high ; lamina of leaves 2–10 cm. long, 0.4–1.8 cm. broad ; lip suborbicular, elliptical, or obcordately flabellate :

Leaves narrowly oblong or oblong-lanceolate, tapering gradually to the petiole, obtuse or rounded and emarginate at the apex, 2–6.5 cm. long, 0.4–1 cm. broad ; scape about half as long again as the leaves ; flowers green ; dorsal sepal 5–6 mm. long ; petals narrower, 5–6 mm. long ; lip elliptical-obcordate, side lobes rounded, middle lobe reduced to an apiculus, lip 3.5–4.5 mm. long, 3–4 mm. broad, calli small, tooth-like 9. *epiphytica*

Leaves lanceolate or elliptical-lanceolate, acute, 3–10 cm. long, 0.4–1.8 cm. broad :

Lip flabellate, deeply emarginate, lobes rounded, whole lip 6 mm. long and broad, calli small, blunt, tooth-like ; dorsal sepal 8–9 mm. long ; petals very narrow, 9 mm. long ; scape much exceeding the leaves ; flowers yellow

10. *Deistelii*

Lip suborbicular, narrowed at the base, trilobed at the apex, side lobes large, rounded, middle lobe an apiculus, whole lip 4.5 mm. long, 4 mm. wide, calli pointed like short horns; dorsal sepal 7 mm. long; petals narrower, equal in length; scape longer than the leaves 11. *suborbicularis*

1. *L. kamerunensis* Schltr. in Engl. Bot. Jahrb. 53: 560. *L. capensis* Rolfe in F.T.A. 7: 22, not of Lindl. Cameroons Mt., 6,000-7,000 ft. (Nov. fr.)! Exsicc.—Mann 2129.
2. *L. tridenz* Krenzel. in Engl. Bot. Jahrb. 28: 162; Cat. Talb. Nig. Pl. 145. Flowers yellow-green. S. Nigeria: Oban! Sappoba! French Cameroons and Uganda. Exsicc.—Talb. 872; 873. Kennedy 2635.
3. *L. goodyeroides* Schltr. in Engl. Bot. Jahrb. 38: 152. S. Nigeria: Moliwe, British Cameroons! Exsicc.—Stummer.
4. *L. Caillei* Finet in Bull. Soc. Bot. Fr. 56: 97, t. 1, fig. 1-13. French Guinea. Liberia: Du River (July)! Also Uganda. Exsicc.—Linder 78.
5. *L. Winkleri* Schltr. in Engl. Bot. Jahrb. 38: 163. S. Nigeria: Victoria (May)! Exsicc.—Stossel 5b; 21a.
6. *L. platyglossa* Schltr. in Engl. Bot. Jahrb. 38: 152. S. Nigeria: between Victoria and Buea (July)! Exsicc.—Winkler 240.
7. *L. rufoa* Rich. f.—F.T.A. 7: 19; Chev. Bot. 613. Flowers green or reddish-brown. Sierra Leone: Mabonto-Bumban, N. Province (July)! Sugarloaf Mt.! Pendembu, 300 ft. (July)! Central Province! Liberia: Memmeh's Town (Aug.)! South-west of Kaka Town (Aug. fr.)! Mt. Barclay (June)! Ivory Coast: between Kodokoffi and Tiéouafero! N. Nigeria! S. Nigeria: Lagos! R. Nun! Benin! French Cameroons and Gabon. Exsicc.—Dawe 512. Thomas 764. Deighton 2218. Morson. Sc. Elliot 3957. Linder 345; 349. Barter 20112; 20202. Hepburn. Wilford. Chev. 22346. Unwin. Bunting 13; 38.
8. *L. guineensis* Lindl.—F.T.A. 7: 80; Cat. Talb. Nig. Pl. 145. *L. atacorensis* Chev. Bot. 613. Flowers green to red. Sierra Leone: Jigaya, 1,100 ft. (Sept.)! Rowala, 500 ft. (July)! Bumban, N. Province, 1,000 ft. (July-Aug.)! Liberia: So (Oct. fr.)! Dahomey: Atacora Mts. 1,200-1,800 ft. (June)! S. Nigeria: Oban! French Cameroons and Princes Is. Exsicc.—Deighton 2219. Thomas 1074; 2734. Whitfield. Linder 1127. Chev. 24193. Talb. 713; 777.
9. *L. epiphytica* Schltr. in Engl. Bot. Jahrb. 38: 6, fig. 3. *L. Lloydii* Rolfe. S. Nigeria: Old Calabar (Aug.)! Eket! French Cameroons and Uganda. Exsicc.—Lloyd 3. Talb.
10. *L. Deistellii* Schltr. in Engl. Bot. Jahrb. 38: 151. Cameroons Mt., 6,000 ft. (June)! Exsicc.—Deistel.
11. *L. suborbicularis* Summerhayes in Kew Bull. 1934, 210. *L. epiphytica* Cat. Talb. Nig. Pl. 145. S. Nigeria: Oban! Eket! Exsicc.—Talb. 871; 8370.

26. ANSELLIA Lindl.—F.T.A. 7: 100.

Petals and sepals elliptical, petals often broader than sepals; lip broad, usually broader than long, front lobe more or less orbicular and somewhat retuse, keels 2, the central one either absent or very slightly developed; spots on flowers usually large and dark 1. *africana*

Petals and sepals elliptical or more frequently narrowly elliptical, petals never broader than sepals; lip narrow, usually longer than broad, front lobe elliptical or almost oblong, obtuse, keels 3, the central one smaller but usually quite well developed; spots on flowers usually small and pale 2. *nilotica*

1. *A. africana* Lindl.—F.T.A. 7: 101. *A. confusa* N.E.Br.—A robust epiphyte, up to 3-5 ft. high; in forest or bush. Gold Coast: Ashanti (Dec.)! Abene Kwahu (Jan.)! Abetifi Kwahu, 2,000 ft. (Dec.)! W. Prov., Adum Bamsu (Jan.)! S. Nigeria: Oban! Lagos, Atifera! Fernando Po: Clarence! Cameroons, Belgian Congo, Angola, Uganda. Exsicc.—Fuller. Chipp 626. Fishlock 84. Talb. 1387. Dawodu. Vogel 25. Ansell. Irvine 1820.
2. *A. nilotica* N.E.Br.—F.T.A. 7: 101. *A. humilis* Bull. *A. congolensis* Rodigas.—An epiphyte about 2-3 ft. high; in open forest and savannah. N. Nigeria: 50 miles S. of Zaria (Jan.)! near Zungeru and Lokoja! Katagum! Vom, Bauchi Plateau, 3,000-4,500 ft.! Belgian Congo, Angola to Mozambique, Tanganyika. Exsicc.—Lugard. Dalz. 432. Dent Young 231.

27. POLYSTACHYA Hook.—F.T.A. 7: 103.

*Pseudobulbs or stems narrowly cylindrical, superposed, each one arising some distance above the base of the preceding one and continuing the growth in the same direction: Flowers rather large, sepals over 8 mm. long:

Stems widely creeping, or probably hanging, each pseudobulb arising from near the apex of the preceding one, 3-5 cm. long, one-leaved; leaves knife-shaped with parallel sides, somewhat curved, acute, 8-15 cm. long, 6-8 mm. wide, fleshy, with many overlapping sheaths at the base; flowers solitary, almost sessile; sepals 8-9 mm. long, hairy; lip more or less oblong, side lobes small, front lobe oblong, slightly retuse at the apex, lip 11 mm. long, 6 mm. wide . . . 1. *crassifolia*

Stems erect, pseudobulbs arising some way below the apex of the preceding pseudobulb, 7-20 cm. long, 3-9-leaved; leaves lanceolate-linear or lanceolate, gradually tapering towards the acute apex, the lower ones often very short, up to 22 cm. long, 4-14 mm. wide, rather stiff; raceme simple, laxly 3-11-flowered; sepals narrowly lanceolate, acuminate, 12-18 mm. long, sparsely hairy; lip in general shape lanceolate, side lobes shortly acutely triangular, front lobe long-triangular, sharply acute, lip 8-13 mm. long, 5-8 mm. wide . . . 2. *microbambusa*

Flowers small, sepals under 3.5 mm. long:

Raceme simple; pseudobulbs arising from one-third way up the preceding one, 3-7.5 cm. long, 2-4-leaved; leaves linear-ligulate, apex shortly bilobed, 3-12 cm. long, 3-8 mm. wide; raceme 3-13 cm. long, many-flowered, nodding at the apex;

sepals 2.5-3.5 mm. long; lip 3-lobed, more or less hastate in outline, about 3.5 mm. long, side lobes acute, recurved, middle lobe lanceolate, acuminate

3. *calluniflora*

Inflorescence a many-flowered panicle; pseudobulbs arising from upper part of preceding one:

Pseudobulbs 3.5-8 cm. long, 2-4-leaved; leaves linear-ligulate, 4-9 cm. long, 4-8 mm. wide; inflorescence 3-5 cm. long, branches simple; sepals 2-2.5 mm. long; lip 2 mm. long, broadly hastate, side lobes recurved, middle lobe broadly ovate, lip with small callus at base 4. *superposita*

Pseudobulbs 12-22 cm. long, 4-7-leaved; leaves oblong-lanceolate, unequally bilobed at the apex, lamina 6-14 cm. long, 7-15 mm. wide; inflorescence 5-8 cm. long, branches compound; sepals 2-3 mm. long; lip 2-2.5 mm. long, cruciform, side lobes slightly incurved, middle lobe oblong-ovate, no callus at base of lip

5. *composita*

**Pseudobulbs or stems tufted or closely placed forming a short creeping rhizome:

Pseudobulbs much flattened, more or less prostrate on the substratum, orbicular or broadly elliptical, up to 5 cm. long and broad; stems erect, slender, 2 (or 1) leaved, up to 10 cm. long; leaves oblanceolate, lamina 6-20 cm. by 2-4 cm.; inflorescence with a few branches, usually longer than the leaves; bracts large, frequently longer than flowers, ovate-lanceolate, acuminate; flowers hairy; sepals 6-7.5 mm. long; lip obscurely 3-lobed, 5.5-8 mm. long, side lobes rounded, front lobe obtuse, lip with a pubescent keel in the lower part 6. *affinis*

Pseudobulbs or stems vertically placed, usually much longer than broad, and never much flattened in the plane of the substratum:

†Mature pseudobulbs or stems 1-leaved at the apex:

Pseudobulbs 2-angled, much flattened laterally, 3-5 cm. long, 1-2 cm. broad, with a single leaf at the apex and a leaf on each side at the base; leaves narrowly oblong, with a rounded slightly bilobed apex, 8-15 cm. long, 1.3-2.5 cm. broad; inflorescence branched, 11-17 cm. high; sepals 6.5-15 mm. long; lip 3-lobed, 7.5-11 mm. long, side lobes obtuse, middle lobe shortly acuminate, recurved, lip with short keel at base thickened into a callus in centre of middle lobe

7. *obanensis*

Pseudobulbs or stems terete or almost so, sometimes gradually tapering upwards: Dorsal sepal bearing a short horn-like appendage 1 mm. long near the base, 6 mm. long; pseudobulbs narrowed upwards, 8-10 cm. high; leaves lanceolate, acute or acuminate, 8-10 cm. long, 1.5 cm. broad; inflorescence simple, shorter than leaves, flowers subcapitate; lip simple, rhombic, apex acute, 4 mm. long, with a low callus at base 8. *appendiculata*

Dorsal sepal without an appendage at the back near the base:

Lateral sepals each produced at the base into a hollow spur 2 mm. long; stems very slender, terete, 2-7 cm. long; leaf linear, tapering very gradually upwards, apex shortly bilobed, 4-16 cm. long, 2-4 mm. broad; inflorescence 3-6.5 cm. long, peduncle and rhachis very slender, racemes 1-3, very short, almost umbellate; dorsal sepal 3-5 mm. long; lip 3-lobed, 6 mm. long, side lobes small, oblong, front lobe cuneate; lip with a small callus at the base

9. *bicalcarata*

Lateral sepals not produced into spurs at the base:

Dorsal sepal 8-17 mm. long; laterals united with foot of column to form a mentum 13-22 mm. long; lip 3-lobed, 13-25 mm. long, side lobes small, ovate, middle lobe ovate to orbicular, all lip pubescent inside; stems 5-13 cm. high, rather stout; leaf elliptical-oblong, apex rounded or sub-acute, 13-25 cm. long, 1-2.5 cm. broad; inflorescence 4-18 cm. long

10. *galeata*

Dorsal sepal 6.5 mm. long or less:

Leaves oblong-oblanceolate, suddenly narrowed at the base and thus appearing cordate, 1.8-4 cm. broad, 6-23 cm. long; pseudobulbs tapering from base, 0.7-17 cm. long; inflorescence 6-21 cm. long, paniculate in the upper part; dorsal sepal 4-6.5 mm. long; lip obscurely trilobed, 5-6 mm. long, side lobes rounded, middle lobe ovate, apiculate or acuminate, lip with callus running from base to centre 11. *cultriformis*

Leaves 1 cm. or less broad; stems 2-7 cm. long, not tapering:

Dorsal sepal 4-6 mm. long; mentum 10-12 mm. long; side lobes of lip rounded, obscure; leaves narrowly elliptical-oblong, gradually tapering towards the base, 5-13 cm. long, 6-10 mm. broad; inflorescence much shorter than the leaves, 2-6-flowered; lip 9-10 mm. long, with a long claw, middle lobe more or less orbicular 12. *Supfiana*

Dorsal sepal 1.5-2 mm. long; mentum 2.5-3 mm. long; lip ecallose, side lobes nearly as long as front lobe, incurved, acute; inflorescence 8-20 cm. long, with 4-7 short branches:

Leaves more or less terete, 1-3 mm. in diameter, 12-22 cm. long; claw of

lip shorter than limb, lip 2.2 mm. long, 2.4 mm. broad, front lobe transversely elliptical or orbicular. 13. *tenuissima*
 Leaves narrowly oblong or linear, unequally bilobed at the apex, 9–13 cm. long, 5–6 mm. broad; claw of lip longer than the limb, front lobe orbicular 14. *ashantensis*

††Pseudobulbs or stems 2 or more leaved, leaves sometimes appearing after the flowers :

Pseudobulbs ellipsoid to longly cylindrical, 6–19 cm. long, somewhat flattened, thicker in the middle, 1–1.5 cm. thick, 3–4-leaved in the upper half; leaves oblong or oblong-elliptical, rounded and shortly bilobed at the apex, 10–25 cm. long, 2.5–4 cm. broad; inflorescence paniculate, 9–25 cm. long, with several large sheathing bracts at the base, branches long, only rarely branched again; sepals 3–4 mm. long; lip entire, elliptical-ovate, subacute, 3 mm. long

15. *paniculata*

Pseudobulbs or stems, if elongated, not more than 8 mm. in diameter, if thickened, short and often somewhat conical, the leaves arising in a tuft :

†Stems slender, elongated, not thickened at the base, with no foliage leaves in the lower part which is covered by sheaths and the leaves scattered more or less regularly along the whole length above :

Leaves oblanceolate or elliptical-oblanceolate, 1.5–5.5 cm. broad, usually much tapering towards the base; dorsal sepal over 6 mm. long; lip with a short claw, side lobes large, rounded, front lobe broadly triangular, apiculate; lip with a broad callus in lower centre :

Stems 15–30 cm. high, 4–5-leaved, leaves 7–17 cm. long; inflorescence 6–13 cm. long, branches few, bracts large, distichously imbricate, recurved; flowers glabrous; dorsal sepal 8–11 mm. long 16. *caloglossa*

Stems 7–25 cm. high, 2–5-leaved, leaves 8–24 cm. long; inflorescence 4–30 cm. long, usually much branched but branches sometimes reduced to axillary tufts, bracts small, not distichously imbricate; flowers pubescent; dorsal sepal 6–7 mm. long 17. *laxiflora*

Leaves lanceolate, linear-lanceolate or almost linear, broadest in the lower part and gradually tapering upwards, rarely from 2–2.5 cm. broad, usually much narrower; dorsal sepal 1–7 mm. long :

Plant small, 4–9 cm. high; stems slender, 1.5–4 cm. high, 2–6-leaved; leaves erect, narrowly oblong, 1–2 cm. long, 1–1.5 mm. broad; inflorescence much overtopping the leaves, very slender, simple or once branched, racemes very short, up to 10-flowered; dorsal sepal 1 mm. long; lip entire, rhombic, acute, 1.75 mm. long 18. *seticaulis*

Plant 15–50 cm. high :

Mentum or chin of flower longer than the dorsal sepal; stems stiffly erect; apex of leaves broadly if sometimes acutely bilobed :

Inflorescence unbranched, 4–12 cm. long; dorsal sepal 2.5–4.5 mm. long; mentum conical, obtuse, 5.5–8 mm. long; stems 10–50 cm. high, slender, 4–8-leaved; leaves linear-lanceolate, apex bilobed, 4–16 cm. long, 5–12 mm. wide; lip oblong, 3-lobed, 6–8.5 mm. long, side lobes small, acute, front lobe oblong, retuse, lip with large more or less orbicular hairy callus at base and small tooth in centre just in front . . . 19. *bifida*

Inflorescence branched, 13–22 cm. long; dorsal sepal 2–2.5 mm. long; mentum cylindrical, a little swollen at the apex, 3–3.5 mm. long; stems 8–14 cm. high, 4–5-leaved; leaves lanceolate-oblong, apex rounded, obtusely bilobed, 8–16 cm. long, 9–16 mm. wide; lip narrowly obovate, 3.5–5 mm. long, margins inflexed towards base, 3-lobed, side lobes rounded, overlapping the middle lobe, the latter broadly triangular-ovate

20. *elegans*

Mentum shorter than the dorsal sepal; stems rather flaccid and flexuose, 12–40 cm. long, 4–11-leaved; leaves narrowly lanceolate, 5–21 cm. long, 5–23 mm. broad, apex acute, very narrowly bilobed; inflorescence simple or more usually somewhat branched, 4–12 cm. long; dorsal sepal 5–7 mm. long; lip 3-lobed at the base, 5–7.5 mm. long, lateral lobes spreading, narrow, middle lobe much larger, broadly cuneate, retuse

21. *rhodoptera*

††Stems usually short, often thickened at the base to form a more or less conical pseudobulb, internodes short so that the leaves are borne in a tuft near the base; if stem elongated the lowest foliage leaf-base arises from the base of the stem :

¶Inflorescence simple, no arrested branches in axils of lower bracts :

Lip 6–9.5 mm. long, with a long narrow hairy claw with infolded margins, an elliptical apiculate lamina, and a large 2–4-lobed flat callus at the base of and wider than the lamina; mentum cylindrical, 6–7 mm. long; stems erect, 2–7 cm. high, swollen (0.5–1 cm. diameter) at the base; leaves linear-oblong or oblong-lanceolate, obtusely bilobed, 2.5–9 cm. long;

- inflorescence 1-9 cm. long, up to 10-flowered; dorsal sepal 5.5-6.5 mm. long 22. *alpina*
- Callus of lip small, not lobed; mentum broadly conical, not cylindrical:
- Bracts very slenderly and longly subulate from a very short broader base, widely spreading or reflexed; inflorescence many-flowered; dorsal sepal 2-3 mm. long; lateral sepals long-acuminate; leaves oblong-linear:
- Side lobes of lip oblong-elliptical, much broader than front lobe, latter sharply recurved, lanceolate, acuminate, disk setose or glabrous; pseudobulbs 1-5 cm. long; leaves 4-13 cm. long, 5-11 mm. broad; inflorescence 4-12 cm. long 23. *albo-vioacea*
- Side lobes of lip spreading, narrowly triangular-oblong, acute, much smaller than the middle lobe, latter oblong or almost orbicular, apiculate; pseudobulbs 6-15 cm. long; leaves 7-30 cm. long, 1-2.2 cm. broad; inflorescence 12-22 cm. long 24. *polychaete*
- Bracts short, lanceolate or very broad, acute or apiculate; lateral sepals acute or with a horn-like apiculus below apex:
- Pseudobulbs depressed-globose, 12 mm. in diameter, total stem up to 5 cm. long, 3-5-leaved; leaves elliptical-lanceolate, acute, 8-17 cm. long, 1.4-2.7 cm. broad; inflorescence 9-22 cm. long, many-flowered; bracts lanceolate, acuminate; mentum conical, 5-7 mm. long; dorsal sepal 3-4 mm. long; lip more or less obovate, acutely 3-lobed at the apex, 4.5-6.5 mm. long 25. *leonensis*
- Pseudobulbs very small, plant almost leafless at time of flowering; leaves (where known) linear-oblong, obtuse, up to 17 mm. broad; roots numerous, flattened, frequently green and assimilating; lip usually sharply reflexed just below the middle, and furnished with 1 or 2 large cushions of hairs; sepals frequently with a horn-like apiculus just below the apex:
- Lip not sharply reflexed, 5-5.5 mm. long, hypochile orbicular from a narrow base, 4-4.5 mm. long, with 2 hairy cushions in the upper part and a tooth-like callus at the base, epichile transversely oblong or semi-orbicular, margins much undulate; dorsal sepal 3.5-4 mm. long; mentum 6.5 mm. long 26. *Dalzielii*
- Lip sharply reflexed below the middle:
- Lip without a callus or keel at the base and with a single cushion of hairs in the upper part:
- Lip not hollowed out at the apex, 7 mm. long, 3-lobed, side lobes spreading, linear, 1.5 mm. long, middle lobe much larger, oblong-elliptical, rounded at the apex, with a single cushion of hairs in the centre; dorsal sepal 3 mm. long; mentum 4-4.5 mm. long; inflorescence 5-8 cm. long, many-flowered 27. *monolenis*
- Lip hollowed out at the apex into a sac, 4 mm. long, entire, pandurate-oblong with a narrow claw, sac furnished with a large transversely elliptical cushion of hairs; dorsal sepal 2.5 mm. long; mentum 3 mm. long; inflorescence 5-12 cm. long 28. *saccata*
- Lip with a callus or keel at the base, reflexed just at base of cushions of hairs, hair-cushions 2, elongated, contiguous or separated:
- Mentum of flower curved, 10-11 mm. long; lip 17 mm. long (stretched straight), claw narrow, 4.5-5 mm. long, mesochile with obtusely triangular side lobes, hair-cushions contiguous, epichile orbicular, inflexed, concave, 4-4.5 mm. diameter; dorsal sepal 6 mm. long 29. *elastica*
- Mentum scarcely curved, 6.5-9 mm. long; lip 8.5-13 mm. long:
- Claw widened or lobed below the hair-cushions:
- Callus at base of lip forming a high quadrate keel; hair-cushions separate, reaching nearly to the edges of the mesochile; epichile flabellate, not truncate at the base 30. *Pobeguini*
- Callus at base of lip tooth-like, not much elevated; claw of lip frequently with narrow lateral lobes; hair-cushions contiguous, with a broad glabrous border to the mesochile; epichile transversely oblong or semi-orbicular, basal angles truncate 31. *reflexa*
- Claw not widened below the hair-cushions, which are at broadest part of lip and do not reach the margins; epichile \pm orbicular, margin dentate 32. *Victoriae*
- ¶¶ Inflorescence branched, the branches sometimes arrested and represented by short shoots in the axils of the lower bracts (rarely quite simple inflorescences may be found on individual shoots):
- Branches of inflorescence secund (all turning to the same side of the rachis) or almost so:
- Leaves fleshy, narrowly oblong with almost parallel sides, V-shaped in

- section, apex broad, obtusely bilobed, 4-18 cm. long, 5-15 mm. broad; lip with dense cushion of erect hairs at the base; inflorescence 6-30 cm. high with up to 8 laterals; laterals short, up to 4 cm. long, many-flowered; dorsal sepal 1-2 mm. long; lip trilobed, 2.5-3 mm. long, side lobes ovate, rather incurved, middle lobe elliptical, retuse . . . 33. *golungensis*
- Leaves not very fleshy, oblanceolate, or narrowly elliptical-lanceolate, sides not or scarcely parallel, 7-27 cm. long; lip with a distinct keel running from the base to the middle or above; inflorescence up to 80 cm. high, usually over 15 cm.:
- Leaves narrowly elliptical-lanceolate, acutely bilobed at the apex, 1-2.7 cm. broad; dorsal sepal 3.5-5 mm. long; lip 3-lobed at the apex only, 4-7 mm. long; lobes almost the same in length, middle lobe very broadly deltoid-semiorbicular, apiculate, margins very undulate, with a small keel in the centre separate from the basal one; stem somewhat elongated . . . 34. *mukandaensis*
- Leaves oblanceolate or oblong-elliptical, obtusely or subacutely bilobed at the apex, 1.5-5 cm. broad; dorsal sepal 2.5-3.5 mm. long; lip 3-lobed at the middle, 4-5 mm. long, middle lobe oblong or almost orbicular, much longer than the laterals, with the margin undulate towards the base, no keel at the apex . . . 35. *tessellata*
- Branches of inflorescence not secund, sometimes represented by a single short branch:
- Dorsal sepal 1.8-2 mm. long; leaves oblong-elliptical or oblanceolate, acute, 4-18 cm. long, 1-3 cm. broad; inflorescence a spreading compound panicle with slender many-flowered branches, 6-25 cm. high; lip 3-lobed in the upper half, 2.5-4 mm. long, margins incurved below, eciliate, side lobes spreading, rounded-triangular, middle lobe elliptical, smaller than the side lobes but projecting in front of them, 0.7-0.8 mm. long . . . 36. *ramulosa*
- Dorsal sepal 3-6 mm. long:
- Lip without a callus at the base or centre, 3-5.5 mm. long, rhombic in outline, trilobed in the distal half, side lobes rounded, middle lobe broadly ovate, acute; leaves oblong-lanceolate, 3-12 cm. long, 0.7-3 cm. broad; sepals long-acuminate; bracts narrowly subulate-acuminate . . . 37. *coriscensis*
- Lip with a callus at the base or in the centre:
- Panicle large with spreading branches, 13-40 cm. high; side lobes of lip incurved, acute, middle lobe oblong, retuse at the apex; leaves oblanceolate, acute, 10-28 cm. long, 1.5-4.5 cm. broad:
- Dorsal sepal 3-3.5 mm. long; lip 4-4.5 mm. long, front lobe nearly quadrate or longer than broad, callus short, central, not continuous to the base . . . 38. *puberula*
- Dorsal sepal 4-5.5 mm. long; lip 6-7.5 mm. long, front lobe transversely oblong, broader than long, callus a linear keel extending from the base to the centre . . . 39. *odorata*
- Panicle small with erect or suberect branches, 4-14 cm. high; side lobes of lip rounded, not incurved, middle lobe triangular, ovate or elliptical, acute at the apex:
- Rhachis and flowers densely pubescent; leaves of young growth not properly developed at time of flowering; leaves narrowly oblong, apex obtusely bilobed, 8-30 cm. long, 1.2-2.2 cm. broad; dorsal sepal 3.5-6 mm. long; lip 5-7.5 mm. long, 3-4.6 mm. broad . . . 40. *dolichophylla*
- Rhachis more or less pubescent, flowers almost or quite glabrous; leaves of young growth fully expanded at time of flowering; leaves oblanceolate, apex acute, 11-21 cm. long, 1-3 cm. broad; dorsal sepal 3.5-4 mm. long; lip 4-4.5 mm. long, 2.7-3 mm. broad . . . 41. *subulata*
1. *Polystachya crassifolia* Schltr. in Engl. Bot. Jahrb. 38: 7. A creeping epiphyte with pale brownish flowers. S. Nigeria: Moliwe, 750 ft. (Jan.)! Exsicc.—Schlechter 12841.
 2. *P. microbambusa* Kraenzl. in Kew Bull. 1926, 245. *P. cyperacearum* Chev. Bot. 616. *Nienokuea lutea* Chev. Bot. 622. A yellow-flowered bamboo-like herb growing on granite outcrops usually on or among the roots of large sedges. French Guinea: Nzo Mt., 5,000 ft. (March)! Sierra Leone: Kanno country (July-Aug.)! Kambona Wunde (June)! Mapaki to Mabonto (Aug.)! Lengekoro (July)! Mandu, between Bo and Mongeri (July)! Ivory Coast: Bouaké, Mt. Lémélébon (July)! Mt. Nienokoué, 1,500 ft. (Sept.)! Mt. Dou, 4,000 ft. (May)! Exsicc.—Chev. 19466; 21037; 21471; 21475; 22093. *Dawe* 502; 552. *Macdonald* 7. *Glanville* 243. *Deighton* 1206; 1965.
 3. *P. calluniflora* Kraenzl. in Engl. Bot. Jahrb. 28: 166. A small epiphyte with white and pink flowers. Cameroons Mt., Buea, 3,000 ft. (May)! Exsicc.—Deistel 75. *Maitland* 734. *Preuss* 1009 (not seen).
 4. *P. superposita* Rehb. f.—F.T.A. 7: 129. Flowers reddish. Cameroons Mt., 5,000 ft. (Nov.)! Buea (Oct.)! Exsicc.—Mann 2125. *Deistel* (not seen).
 5. *P. composita* Kraenzl. in Fedde, Repert. Beih. 39: 103. A tall epiphyte with reddish-purple flowers. Cameroons Mt.: Buea, 3,000 ft. Fernando Po: Moka, 3,600-5,400 ft. (Nov.)! Exsicc.—Preuss 1072. *Mildbraed* 7068.
 6. *P. affinis* Lindl.—F.T.A. 7: 126. Flowers yellow.



FIG. 330.—*POLYSTACHYA AFFINIS* Lindl. (ORCHIDACEAE).

A, flower. B, column and lip. C, pollinia.

- French Guinea: Sambadougou (Jan.)! Faranah (Jan.)! Sierra Leone: Kennema Town (May)! Makuta, 400 ft. (June)! Wallia (Jan.)! Karina (Jan.)! Gold Coast: Bratu Ebru (Jan.)! S. Nigeria: Degema! Onitsha! Lagos! Eket! Also French Cameroons and Congo. Exsicc.—Chev. 20478; 20550. Lane-Poole 226. Thomas 483; 8239; 9018. Sc. Elliot 4627b. Cummins 15. Talb. 3150; 8776. Barter 1863. Don. Glanville 150.
7. *P. obanensis* Rendle, Cat. Talb. Nig. Pl. 102, t. 13, figs. 1-2. Flowers yellow. S. Nigeria: Oban! Kenya Colony. Exsicc.—Talb. 930.
8. *P. appendiculata* Kraenzl. in Notizbl. Bot. Gart. Berl. 3: 238. An epiphyte with yellow flowers with fine purple markings. Cameroons Mt., Buea. Exsicc.—Lehmback (not seen).
9. *P. bicalcarata* Kraenzl. in Engl. Bot. Jahrb. 36: 118. A small densely tufted epiphyte with rosy-white flowers. Cameroons Mt., Buea, 5,000-6,000 ft. (May)! Exsicc.—Deistel 62c; 79. Maitland 730.
10. *P. galeata* Rehb. f. in Walp. Ann. 6: 637. *P. grandiflora* Lindl.—F.T.A. 7: 127; Chev. Bot. 617. A herb with large hooded yellow or yellow-green flowers with purple or reddish markings. Sierra Leone: Near Njala (May)! Largo (May)! Dilleh-Juleh rocks (June)! Figtree Cemetery (May)! Benduma near Mongeri (July)! Makunde Limba (April)! Liberia: Begwai, St. Johns River (Sept.)! Peter's Town (Oct.)! Ivory Coast: Man (May)! Mt. Nienokoué, 1,500 ft. (July)! S. Nigeria: Degema! Exsicc.—Afzelius. Deighton 711; 2220. Aymer 563. Barter. Sc. Elliot 5719. Ripert in Chev. 21533. Talb. 3726. Bunting 9; 61; 93. Chev. 19495.
11. *P. cultriformis* Spreng. Syst. Veg. 3: 742. *P. cultrata* Lindl.—F.T.A. 7: 109. Flowers white or pale greenish-yellow. Cameroons Mt., Buea, 2,800-4,000 ft. (Nov.)! East Africa, Mascarene Is. Exsicc.—Preuss 1009. Migeod 75.
12. *P. supina* Schltr. in Engl. Bot. Jahrb. 38: 9, 10, fig. 4. Flowers yellow with brown markings. S. Nigeria: Bibundi (April)! Kwa River (March)! Eket! Exsicc.—Schlechter 12415. Talb. 440; 3306.
13. *P. tenuissima* Kraenzl.—F.T.A. 7: 110. Flowers pale yellow. Ivory Coast: Mt. Boho, near Zoanlé (May)! Cameroons. Exsicc.—Chev. 21467.
14. *P. ashtantensis* Kraenzl. in Kew Bull. 1926, 294. Gold Coast: Agogo, 1,000 ft. (Sept.)! Also Uganda. Exsicc.—Chipp 578.
15. *P. paniculata* Rolfe—F.T.A. 7: 113. Flowers orange with red markings. French Guinea: Nzo (March-fruit)! Sierra Leone! Gold Coast: Aburi Hills (Nov.)! Togo: Forest Reserve (Oct.)! S. Nigeria: Degema! Cameroons and Uganda. Exsicc.—Afzelius. Johnson 483. Talb. 3610. Chev. 21051. Thompson 1509.
16. *P. caloglossa* Rehb. f.—F.T.A. 7: 128. *P. exzelsa* Kraenzl. Flowers yellow. S. Nigeria: Ndonge. Cameroons Mt., 5,000 ft. (Nov.)! Buea, 3,000 ft. (May)! Fernando Po: S.W. of island. Exsicc.—Mann 2110. Deistel 213. Maitland 728. Migeod 25. Mildbraed 7110 (not seen).
17. *P. laxiflora* Lindl.—F.T.A. 7: 110; Cat. Talb. Nig. Pl. 146. *P. dicantha* Rehb. f. Flowers white, yellow or orange-yellow. French Guinea: Dalaba (March)! Macenta, 2,000 ft. (May)! Kouria (April)! Sierra Leone: Bafodeya and Freetown! Kamke (Sept.)! Allakalia (April)! Liberia: Bumbuma (Oct.)! Suen (Nov.)! Mt. Barclay (Aug.)! S. Nigeria: Oban! Eket! Brass River! Nun River! Sapoba! Victoria! Moliwe (Aug.)! Fernando Po! French Cameroons, Gabon, Congo, Uganda. Exsicc.—Caille 18107. Pobéguin 1559; 1559b. Collenette 7. Sc. Elliot 5903. Thomas 2080. Linder 1324; 1324a. Bunting 167. Talb. 865; 918; 3039. Barter 1055; 20026. Kennedy. Mann 437. Preuss 1216. Schlechter 15778. Glanville 188.
18. *P. seticaulis* Rendle, Cat. Talb. Nig. Pl. 104. S. Nigeria: Oban! Exsicc.—Talb. 926; s.n.
19. *P. bifida* Lindl.—F.T.A. 7: 108. *P. farinosa* Kraenzl. Flowers white or mauve-white. Cameroons Mt., 4,000-5,000 ft. (Nov.)! Buea, 3,000 ft. (Oct.)! Fernando Po, 4,000 ft. (Dec.)! St. Thomas. Exsicc.—Mann 649; 1339; 2115. Preuss 1064. Johnston 100. Migeod 32.
20. *P. elegans* Rehb. f.—F.T.A. 7: 119. *P. Mannii* Rolfe. Flowers yellowish white. Cameroons Mt., 4,000-6,000 ft. (Nov.-Jan.)! Exsicc.—Mann 1838; 2113. Johnston 99.
21. *P. rhodoptera* Rehb. f.—F.T.A. 7: 109. *P. pyramidalis* Lindl.—Cat. Talb. Nig. Pl. 146. *P. subcorymbosa* Kraenzl. *P. ensifolia* Lindl. Flowers yellow, often tinged rose. Sierra Leone! Liberia: Moyakwelli (Oct.)! Duport (Nov.)! Between Peter's Town and Rebo (Nov.)! S. Nigeria: Sapoba! Nun River (Sept.)! Oban! Princes Island, French Cameroons, Congo and Angola. Exsicc.—Sc. Elliot. Bunting 81. Linder 1290; 1496. Kennedy 1817. Mann 522. Talb. 903.
22. *P. alpina* Lindl.—F.T.A. 7: 128. *P. Preussii* Kraenzl.—Rendle, Cat. Talb. Nig. Pl. 146. *P. Winkleri* Kraenzl. *P. Talbotii* Rolfe. Rendle, l.c. Flowers white or rose. S. Nigeria: Oban, Niagi (Oct.)! Cameroons Mt., 5,900-6,750 ft. (April-May)! Fernando Po, 6,000 ft.! Exsicc.—Mann 647. Preuss 934; 1021. Winkler 1267. Talb. 835; 919.
23. *P. albo-violacea* Kraenzl.—F.T.A. 7: 120. *P. Adansoniae*, Cat. Talb. Nig. Pl. 146, not Rehb. f. *P. nigerica* Rendle, Cat. Talb. Nig. Pl. 103. *P. Caillei* Guillaum. Flower white or yellowish, with purple tinge. French Guinea: Kouria (Aug.)! N'Zerekore, 1,900 ft. (May)! Ivory Coast: Yaou (March)! Gourénil (May)! Gold Coast: Aburi (May)! Birrim, Wankye! S. Nigeria: Oban! Bibundi (April)! Barombi (June)! Cameroons Mt.: Buea, 3,200 ft. (May)! Exsicc.—Pobéguin 1675. Collenette 33. Johnson 223. Chipp 563. Chev. 17760; s.n. Talb. 867; 929. Schlechter 12409. Preuss 298. Maitland 727.
24. *P. polychaete* Kraenzl.—F.T.A. 7: 120; Cat. Talb. Nig. Pl. 146. Flowers greenish-white or greenish-yellow. Liberia: Peterstown (Oct.)! Gold Coast: Aburi (Oct.)! Ashanti Agogo (Nov.)! S. Nigeria: Oban! Cameroons Mt.: Buea, 3,000 ft. (March-May)! Fernando Po: Bokoko above Basilé, 3,300-4,200 ft. Also Belgian Congo, Uganda. Exsicc.—Johnson 224. Deistel 89. Maitland 731. Mildbraed 6445; 6954 (not seen). Bunting 104. Talb. 927; 928. Gillett 8.
25. *P. leonensis* Rehb. f.—F.T.A. 7: 107. Flowers brownish or yellowish green, lip white. Sierra Leone: no locality (May)! Sugarloaf Mt.! S. Nigeria: Amba Bay! Exsicc.—Barter. Sc. Elliot 5822. Deighton 2020. Lord Scarborough.
26. *P. Dalzielii* Summerhayes in Kew Bull. 1927, 418. *P. sp.* F.T.A. 7: 123, under *P. angularis* Rehb. f. French Guinea: Dalaba (March)! Gangan, 3,300 ft. (Jan.)! Liberia: Grand Bassa (April)! Ivory Coast: Mt. Gbon, 3,300 ft. (May, fruit)! Exsicc.—Dalt. 8433. Vogel 104. Chev. 21412. Jacques 424.
27. *P. monolepis* Summerhayes in Kew Bull. 1935, 198. *P. expansa* Ridl. in part; F.T.A. 7: 122, in part. Sierra Leone! Exsicc.—Wiford.
28. *P. saccata* Rolfe in Orch. Rev. 26: 107. *Epiphora saccata* Finet. Flowers white and rose. French Guinea: Pita (April)! Dittinn (April)! Exsicc.—Pobéguin 2302b (not seen); 2294. Chev. 12985.
29. *P. elastica* Lindl.—F.T.A. 7: 129. Sierra Leone: Bagroo River (April)! Exsicc.—Afzelius (not seen). Mann 902.
30. *P. Pobeguinii* Rolfe in Orch. Rev. 26: 107. *P. elastica* Chev. Bot. 616, partly. *Epiphora Pobeguinii* Finet. Flowers bright rose; lip darker purple with yellow cushions of hairs. French Guinea: Dalaba (April)! Ninkan (April). Labé. Exsicc.—Pobéguin 2087; 2089 (not seen). Caille 18141.
31. *P. reflexa* Lindl.—F.T.A. 7: 127, in part. *P. elastica* Chev. Bot. 616, partly. *P. Iberica* Rolfe. *P. Smythiana* Rolfe. Flowers pale rose-purple, with yellow cushion of hairs.

- Sierra Leone: Hamilton (Feb.)! Waterloo to York! Liberia! Ivory Coast: Mt. Dou, 4,000 ft. (May)! Exsicc.—*Whitfield. Smythe* 56; 252. *Johnston. Fleury* 21470.
32. *P. Victoriae* Kraenzl. in Engl. Bot. Jahrb. 28: 165. Flowers white or pale lilac with yellow hairs. S. Nigeria: Victoria (Febr.)! Nkolenjeng (Feb.)! Exsicc.—*Deistel* 190. *Simon* 14. *Schonkopf* 30 f.
33. *P. goulungensis* Rehb. f.—F.T.A. 7: 118. *P. Johnsonii* Kraenzl. Flowers yellow-green. French Sudan: Diaragonéla (Feb.)! Ivory Coast: Bouroukrou (Dec.-Jan.)! Gold Coast: Aquapim Hills (Dec.)! Angola, Belgian Congo, Uganda. Exsicc.—*Johnson* 588. *Chev.* 473; 16906.
34. *P. mukandaensis* De Wild. Not. Pl. Ut. Congo, 189. *P. Plehniana* Schltr. *P. Dorotheae* Rendle, Cat. Tab. Nig. Pl. 103. Flowers yellow-green with brown-purple markings. Gold Coast: Kumasi (Dec. fruit)! Togo: Alavanyo, 750–1,750 ft. (Sept.)! S. Nigeria: Onika Oloro (Oct.)! Oban! French Cameroons and Uganda. Exsicc.—*Vigne* 1522a. *Thomas* 1902. *Talb.* 861. *Thompson* 1473.
35. *P. tessellata* Lindl.—F.T.A. 7: 114; Cat. *Talb. Nig. Pl.* 146. *P. praealtia* Kraenzl.—*Stapf* 654. *P. Lehmbachiana* Kraenzl. Flowers greenish white or pale yellow with orange to purple markings. French Guinea: Songueta (June)! Kindia! Sierra Leone: Bumbuna! Figtree Cemetery, Freetown! Gloucester (Aug.)! Dilleh-Juleh rocks (Aug.)! Liberia: Grand Bassa (Sept.)! Ivory Coast: Danané, 1,200 ft. (June)! Between Sanrou and Ouodé (May)! Mt. Barclay (June)! Gold Coast: Aburi (June)! N. Nigeria: Omewo (July)! S. Nigeria: Nun River (Aug.)! Brass River! Oban! Cameroons Mt.: Buea, 3,000 ft. (May)! Fernando Po: Bakoko. St. Thomas, French Cameroons, Angola, Uganda. Exsicc.—*Pobéguin. Jacques* 10. *Thomas* 3436. *Deighton* 150. *Dinklage* 2069. *Collenette* 42; 50; 51. *Johnson* 2. *Chev.* 21626. *Elliot* 80. *Mann. Barter* 1856. *Talb.* 862; 863. *Lehmbach* 5. *Mailand* 724. *Mildbraed* 6917 (not seen). *Bunting* 75.
36. *P. ramulosa* Lindl.—F.T.A. 7: 118; Cat. *Talb. Nig. Pl.* 146. Flowers pale yellow and pink. Sierra Leone: Sugar Loaf Mt. Njala (July)! Gold Coast: Kanyankov (Nov.-Dec.)! Assin Yan Kumasi (Jan.)! S. Nigeria: Oban! Degema! French Cameroons, Uganda. Exsicc.—*Deighton* 1742. *Miles* 22. *Cummins* 73. *Talb.* 864; 8647.
37. *P. coriacescens* Rehb. f.—F.T.A. 7: 120. *P. Kiessleri* Schltr. Flowers yellow, tinged brown. S. Nigeria: Moliwe (Aug.)! Eket! Also Gabon. Exsicc.—*Schlechter* 15780. *Talb.*
38. *P. puberula* Lindl.—F.T.A. 7: 114. Flowers yellow. French Guinea: Konkouré (June)! Sierra Leone: Makumri (June)! Jigaya! Njala (May)! Dilleh-Juleh rocks, River Tala (June)! Liberia: Mt. Barclay (June)! Exsicc.—*Pobéguin* 1624. *Thomas* 515; 2573. *Dave* 492. *Deighton* 712. *Bunting* 5; 58.
39. *P. odorata* Lindl.—F.T.A. 7: 113. Flowers white or yellow, tinged rose. Ivory Coast: Bouroukrou! Between Sanrou and Ouodé (May)! Mt. Donron, Koualé, 3,000 ft. (May)! Gold Coast: Offin Valley! S. Nigeria: Ogunshileh, Afoma (April)! Onitsha! Calabar (May)! Ewe Ela, Lagos! Ijebu, Shasha Forest (May)! Sapoba! Bibundi (April)! Victoria (May)! Cameroons Mt.: Buea! Fernando Po: no locality (June)! French Cameroons, Belgian Congo, ? Uganda. Exsicc.—*Chev.* 16604; 21607; 21740. *Miles* 13. *Thompson* 453; 508. *Barter* 1483. *Kennedy* 1686. *Schlechter* 12431. *Mailand* 729. *Preuss* 1218. *Mann* 436. *Richards* 3409.
40. *P. dolichophylla* Schltr. in Engl. Bot. Jahrb. 38: 8. *P. Hamiltonii* W.W. Sm. *P. guerezorum* A. Chev. Bot. 617. *P. Simoniana* Kraenzl. *P. oxychita* Schltr. ex Kraenzl. Flowers yellow. French Guinea: Between Moribadou and Nionneradougou (March)! N. Nigeria: S. of Benue River! S. Nigeria: Victoria (Feb.)! Cameroons Mt.: Buea, 2,400–3,000 ft. (Jan.)! Exsicc.—*Chev.* 20950. *Hamilton. Schlechter* 12837. *Dunlap* 145. *Baum. Simon* 14.
41. *P. subulata* Finet in Leconte, Notul. Syst. 2: 26. *P. inaperta* Guillaum. Flowers white, mentum violet. French Guinea: Tabelli! Bonlou Kountou (June)! Ivory Coast: between Sanrou and Ouodé (May)! Mt. Morny, 1,500 ft. (April)! Exsicc.—*Blanc. Pobéguin* 1625. *Chev.* 21379; 21601; 21637.

28. CALANTHE R.Br.—F.T.A. 7: 45.

Rhizome stout; leaves 3–5, long-petiolate, lanceolate or elliptical-lanceolate, acuminate, lamina 15–35 cm. long, 4–10 cm. wide, petiole 10–17 cm. long, dilated at the base; inflorescence erect, 30–60 cm. high; flowers white and mauve or pink; sepals oblong-lanceolate, acute, 12–17 mm. long; lip trilobed at the base, 10–14 mm. long, side lobes short, rounded, front lobe divaricately bilobed with a short claw, side lobes oblong, more or less toothed on the outside, disk with a warty crest in front of the column; spur 12–22 mm. long, slender *corymbosa*

- C. *corymbosa* Lindl.—F.T.A. 7: 46. *C. delphinioides* Kraenzl. Terrestrial in forests. French Guinea: Dalaba to Diaguissa, 3,000–4,000 ft. (Sept.-Oct.)! S. Nigeria: Bamenda, Fonfaka, 3,000 ft. (June)! Cameroons Mt., 5,000 ft.! Mimbia, 3,600 ft.! Fernando Po, 5,000 ft.! St. Thomas, Belgian Congo, Uganda. Exsicc.—*Johnston* 107. *Preuss* 1061. *Mailand* 1785. *Mann* 392. *Chev.* 18852.

29. ANCISTROCHILUS Rolfe—F.T.A. 7: 44.

Pseudobulbs orbicular, flattened, 2.5 cm. in diameter; leaves narrowly lanceolate; sepals and petals lanceolate, acuminate, 2.5–4.5 cm. long, white, greenish at the base; lip middle lobe 10–25 mm. long, bright purple, side lobes green with brown markings

1. *Thomsonianus*

Pseudobulbs conical or pyriform, 2.5–5 cm. in diameter; leaves elliptical-lanceolate; sepals and petals broadly lanceolate, acute or shortly acuminate, 2–3 cm. long, rose-coloured or nearly white; lip middle lobe 8–11 mm. long, purple with a yellow apex, side lobes green with brown markings 2. *Rothschildianus*

1. *A. Thomsonianus* Rolfe—F.T.A. 7: 44; Cat. *Talb. Nig. Pl.* 146. S. Nigeria: Oban! Near Victoria (Sept.)! Old Calabar! Also French Cameroons, Gabon and Belgian Congo. Exsicc.—*Kalbreyer. Talb.* 88. *Schlechter* 15762.
2. *A. Rothschildianus* O'Brien in Gard. Chron. ser. III, 41: 51, fig. 24. Sierra Leone! S. Nigeria: Sapoba, Jameson R. (Nov.)! Exsicc.—Cultivated specimens (*Bowden, Rothschild*). *Ross* 227.

30. BULBOPHYLLUM Thou.—F.T.A. 7: 22, including *Megacalinium* Lindl.

*Pseudobulbs normally 1-leaved:

Leaves terete, over 15 cm. long, 1.5–2 mm. in diameter; pseudobulbs narrowly cylindrical, 2.5–3 cm. long; scapes much shorter than leaves, flowering nearly from base, rhachis rather swollen but not much flattened, bracts 2 mm. long

1. *teretifolium*

Leaves flat :

Petals with long spreading hairs, spatulate from a narrow base, black, 2 mm. long ; lip lingulate, hairy, black ; sepals and lip 4-5 mm. long, all obtuse ; pseudobulbs rather onion-shaped, 1-1.5 cm. long, 1.5 cm. in diameter ; leaves 7-8 cm. long, 1 cm. broad ; scapes 12-32 cm. high, many-flowered in the upper half

2. *nigripetalum*

Petals glabrous or papillose, entire, shortly ciliate or denticulate :

Lip with pink, red or brown hairs at least as long as half the width of the lip and usually much longer ; sepals nearly similar to each other, narrowly lanceolate, 7-13 mm. long ; petals linear-subulate, quite glabrous ; column with long subulate awns :

Longer hairs on lip with club-shaped swollen ends ; pseudobulbs much flattened, elliptical or circular in outline, 1.5-2.5 cm. long, 1.5-2 cm. wide ; inflorescence 10-20 cm. long, laxly many-flowered, bracts spreading . . . 3. *barbigerum*

Longer hairs on lip not club-shaped or swollen at ends ; bracts not spreading :

Flowers opening successively, only one open at a time ; bracts less than 1 cm. long ; scape 15-60 cm. high, flowering in upper half only :

Pseudobulbs narrowly conical-ovoid, flattened, only slightly angled ; leaves narrowly elliptical or oblanceolate, 9-13 cm. long, 1.5-2.5 cm. wide, rather thin in texture . . . 4. *distans*

Pseudobulbs broadly ovoid or orbicular-ovoid, flattened, markedly 3-4-angled ; leaves broadly elliptical, 7-14 cm. long, 1.5-4 cm. wide, thick in texture

5. *Kindtianum*

Flowers several or all open at once ; bracts more or less imbricate :

Scape short, 4-9 cm. long, densely flowered in the upper half or two-thirds ; bracts 5-7 mm. long ; pseudobulbs conical-ovoid, obscurely 3-angled ; leaves elliptical, 6-12 cm. long, 1.5-2.5 cm. wide . . . 6. *sallatorium*

Scape long, 30-55 cm. long, flowering only in the upper third or quarter ; bracts 1.2-2.5 cm. long ; pseudobulbs ovoid or oblong-ovoid, markedly 4-angled ; leaves elliptical, 12-28 cm. long, 2.5-6 cm. wide ; lip broadly lingulate :

Petals scarcely longer than the column, 4.5 mm. long ; bracts acute, 1.2-2.2 cm. long, 3-6 mm. wide ; hairs on lip deep red . . . 7. *calamarium*

Petals much longer than the column, 6.5-7.5 mm. long ; bracts obtuse or subacute, 1.7-2.5 cm. long, 7-13 mm. wide ; hairs on lip reddish-brown

8. *phaeopogon*

Lip glabrous, papillose, if ciliate or hairy the hairs much shorter than half the width of the lip :

Sepals with long hairs, 8-11 mm. long ; petals lanceolate or spatulate-lanceolate, densely papillose, 3-4 mm. long ; lip very fleshy, densely papillose ; stelia of column obtuse ; rhachis more or less swollen and fleshy :

Sepals hairy over the whole surface, only slightly keeled at back ; scape 6-13 cm. long ; leaves 12-20 cm. long, 1.3-2.5 cm. wide . . . 9. *comatum*

Sepals with prominent hairy keels on outside, otherwise only pubescent ; scape 3.5-7.5 cm. long, pendulous, much swollen ; leaves 8-11 cm. long, 2.5-4 cm. wide . . . 10. *inflatum*

Sepals glabrous or very shortly papillose, or pubescent :

†Rhachis fleshy and more or less flattened ; bracts reflexed after flowering ; scape 15-30 cm. long, robust :

Rhachis flattened, not very fleshy, 6-12 mm. wide ; bracts very narrow, subulate from a broader base, 3-5 mm. long ; pseudobulbs flattened, ovoid, 3-4-angled, 1-4 cm. long ; leaves oblong-elliptical, 4-16 cm. long, 8-25 mm. wide ; sepals acuminate, dorsal 1 cm. long ; lip pectinate at the base ; scape 20-30 cm. long . . . 11. *Imshootianum*

Rhachis fleshy, not much flattened, 4-6 mm. wide ; bracts as broad as the rhachis, deltoid-ovate, obtuse ; lip much curved, with rounded basal lobes, and a thin longitudinal keel underneath ; lateral sepals falcate-ovate, recurved :

Lip entire at the base ; petals 1.8 mm. broad, 3-nerved, not papillose ; dorsal sepal lanceolate, acute, 8.5 mm. long ; pseudobulbs ovoid, 3-angled, 1-2 cm. long ; leaves 7-9 cm. long, 1.5 cm. wide . . . 12. *magnibracteatum*

Lip pectinate at the base ; petals 0.6 mm. broad, 1-nerved, papillose ; dorsal sepal lanceolate, 7.5 mm. long ; pseudobulbs elongate-ovoid, 3-4-angled, 2.5-4 cm. long ; leaves 11-20 cm. long, 1.3-2.2 cm. wide . . . 13. *Lindleri*

††Rhachis terete, not thicker than the peduncle ; bracts sometimes spreading but not reflexed :

‡Lip with entire or very shortly papillose margins, not ciliate :

Lateral sepals over 9 mm. long, long-acuminate ; pseudobulbs conical-ovoid, 1-2 cm. long :

Flowers orange ; column 1 mm. long, longer than stelia ; leaves linear-

- oblong with a long petiole, 13–18 cm. long, 11–16 mm. wide; scape 18–22 cm. long; lip quite glabrous; lateral sepals tapering gradually from the base 14. *Gustavi*
- Flowers white; column 0.5 mm. long, shorter than stelidia; leaves elliptical with a very short petiole, 4.5–7 cm. long, 14–18 mm. wide; scape 9–19 cm. long; lip papillose towards margins, latter entire; lateral sepals suddenly narrowed upwards in the lower half 15. *Schimperianum*
- Lateral sepals under 7 mm. long, acute:
- Lip sharply acute, the basal lobes folded backwards over the base itself, disk with 2 small calli near the centre; petals broadly lanceolate from a short claw, margins papillose, 2–2.5 mm. long; sepals 4–4.5 mm. long; pseudobulbs ovoid, flattened, 1–2 cm. long; leaves 4–7 cm. long, about 1.5 cm. wide; scape 8–24 cm. long, flowering nearly from the base 16. *Buntingii*
- Lip obtuse or subacute, densely papillose in distal half; petals oblong or linear-oblong:
- Pseudobulbs ovoid, 8–10 mm. long; sepals very narrow, 5 mm. long, 0.7–1.2 mm. wide; petals linear-oblong, 2 mm. long, 0.4 mm. wide; stelidia 9 mm. long, longer than the column; basal lobes of lip scarcely developed 17. *Milesii*
- Pseudobulbs 1.5–2.5 cm. long, conical-ovoid; sepals 5–7 mm. long, 1.4–2 mm. wide; petals elliptical-oblong, 1.6–2.3 mm. long, 0.7–1 mm. wide; stelidia 0.8–1.2 mm., longer than the column; basal lobes of lip well developed; leaves elliptical-oblong, 6–14 cm. long, 1–2.2 cm. wide 18. *flavidum*
- ††Lip with ciliate or ciliolate margins:
- Pseudobulbs 3–8 mm. long; scape almost filiform, up to 13 cm. long; flowers 2–15, distant; leaves oblong to linear-oblong, 1–8 cm. long, 2.5–5.5 mm. wide; sepals finely acuminate, 2.5–4.5 mm. long; petals ovate or obovate, denticulate, 1–2.5 mm. long; lip 3-lobed, side lobes ciliate, middle lobe ciliate at the base, papillose at the apex 19. *intertextum*
- Pseudobulbs over 1 cm. long; scape slender but not filiform; flowers densely placed:
- Sepals over 8 mm. long, finely acuminate; pseudobulbs ovoid, 4-angled, 2–3 cm. long; leaves oblong-oblancoate, acute, 8–17 cm. long, 1.2–2.5 cm. wide; scape 20–30 cm. long, peduncle 4–7 cm. long; petals oblancoate, denticulate, 2.5 mm. long; lip ciliolate in the lower part 20. *coccinum*
- Sepals under 6 mm. long, acute or obtuse:
- Leaves linear-oblong, 11–18 cm. long, 5–11 mm. wide; lip distinctly 3-lobed, side lobes ciliate, middle lobe papillose; column with a small rounded callus on the foot just below the stigma, and dilated on each wing at the bases of the stelidia; pseudobulbs conical or conical-cylindrical, 2–4.5 cm. long; scape 7–12 cm. long, peduncle very short; sepals 3.5–4.5 mm. long 21. *nigritianum*
- Leaves oblong-lanceolate or oblong-elliptical, over 1 cm. wide; lip indistinctly 3-lobed; column without a rounded callus below the stigma:
- Peduncle longer than the spike, often much longer:
- Scape very short, 2–3 cm. long, spike almost capitate, 7–12 mm. long; pseudobulbs ovoid, 1–2 cm. long; leaves lanceolate, acute, 8–9.5 cm. long, 11–17 mm. wide; sepals 2.5–4 mm. long; petals oblong, apiculate, 1.5–2 mm. long; lip ciliolate, keels glabrous; stelidia longer than column 22. *Winkleri*
- Scape usually as long as or longer than the leaves, 5–16 cm. long, spike elongated:
- Keels of lip glabrous; sepals greenish-yellow, reddish only at the base, 2.3–4 mm. long; pseudobulbs ovoid or conical-ovoid, obscurely 4-angled, 1–2.5 cm. long; leaves elliptical-oblancoate, obtuse or acute, 4–12 cm. long, 1–2 cm. wide; lip very shortly ciliolate in the lower part, papillose near the apex 23. *recurvum*
- Keels of lip pubescent or long-papillose; sepals dark red, obtuse, 3.2–3.7 mm. long; pseudobulbs ovoid, somewhat flattened, obscurely 2–3-angled, 1.3–2 cm. long; leaves oblong elliptical, 4.5–11 cm. long, 1.4–2.2 cm. wide; lip densely ciliate all around 24. *pavimentatum*
- Peduncle shorter than the spike, 1.5–4 cm. long; scape 5–12 cm. long, many-flowered; pseudobulbs conical-ovoid, obscurely 4-angled, 1–1.5 cm. long; leaves oblong or oblong-lanceolate, 4–10.5 cm. long, 1–1.5 cm. wide; sepals 4–5 mm. long; lip ciliate all round, keels shortly papillose or almost glabrous 25. *porphyroglossum*
- **Pseudobulbs normally 2-leaved:
- Scapes 1-flowered, 2–3 cm. high; a dwarf creeping plant; pseudobulbs depressed,

- almost 2-lobed, 3-4 mm. long, 4-7 mm. across; leaves 8-15 mm. long, 2-4 mm. wide; sepals 4.5-9.5 mm. long, caudate-acuminate; petals lanceolate, 4-7 mm. long, caudate-acuminate; lip obscurely 3-lobed, base rounded, apex narrowed, glabrous 26. *elaidum*
- Scapes several- or many-flowered:
- Lip hairy, hairs often very long; rhachis slender, not thicker or wider than the peduncle:
- Bracts short, 3-4 mm. long, not imbricate; hairs on lip in length less than half width of lip; sepals 4 mm. long; petals lanceolate, acute, 1.6 mm. long; lip fleshy, 1.6 mm. long, ciliate; pseudobulbs narrowly cylindrical, 3-4 cm. long, 3-5 mm. in diameter; leaves linear-oblong, 5 cm. long, 5 mm. wide; scape 10 cm. long 27. *tenuicaule*
- Bracts large, broad and boat-shaped, 6-11 mm. long, spreading, and more or less imbricate; hairs on lip longer than half the width of the lip; lip lingulate from a narrower base:
- Scape 10-24 cm. long; leaves 4-15 cm. long:
- Pseudobulbs elongate-ovoid, 4-angled, 2-3.5 cm. long; leaves 6-12 cm. long, 5-8 mm. wide; sepals 6-7 mm. long; petals oblong-ligulate, 2.3 mm. long; lip 5-5 mm. long, base very thick and fleshy 28. *gravidum*
- Pseudobulbs narrowly cylindrical, 2.5-9 cm. long, 3-5 mm. in diameter; leaves 4-15 cm. long, 4-15 mm. wide; sepals 5 mm. long; petals subfalcate-lanceolate, fleshy, 2-2.5 mm. long; lip 3-5 mm. long 29. *cochleatum*
- Scape 45-60 cm. long; leaves 11-20 cm. long, 11-18 mm. wide; pseudobulbs conical-cylindrical, 8-9 cm. long, 7-12 mm. in diameter at the base; sepals 7-7.5 mm. long; petals falcate-ligulate, 2-2.7 mm. long; lip 4-4.5 mm. long 30. *Mannii*
- Lip glabrous, rarely papillose:
- Bracts large, spreading, strictly distichous, more or less rigid, 1 cm. or more long; rhachis more or less angular, but not much wider than the peduncle:
- Bracts very broad, boat-shaped, imbricate, 1.2-2 cm. long; scape stout, 15-35 cm. long, peduncle almost enveloped in broad obtuse loose sheaths; rhachis and bracts bearing black chaffy hairs; pseudobulbs 4-angled, 5-8 cm. long; leaves oblong-elliptical, 13-21 cm. long, 3-4.5 cm. broad; flowers small, red; petals subulate; lip with fleshy centre and narrow dentate wings, apex reflexed 31. *lupulinum*
- Bracts narrow, acuminate, distant, 1-1.5 cm. long; scape 10-20 cm. long, sheaths of peduncle tight, acute; rhachis and bracts nearly glabrous; pseudobulbs 4-angled, 1.5-3.5 cm. long; leaves linear-oblong, 3-10 cm. long, 7-10 mm. wide; flowers rose-coloured; petals orbicular-oblong; lip with entire margins 32. *bifarum*
- Bracts much less than 1 cm. long, spreading or reflexed:
- Pseudobulbs narrowly cylindrical, slightly tapering upwards, 5-10 cm. long, 6 mm. in diameter; leaves broadly oblanceolate, 9-20 cm. long, 2-4 cm. wide; scape 30-40 cm. long, rhachis flattened into broad wings with undulate margins, about 1.5 cm. broad, flowers in a row along centre of each side of rhachis; bracts small, triangular, reflexed; flowers unknown 33. *longibulbus*
- Pseudobulbs ovoid or conical-ovoid, frequently flattened or angular, up to 7 cm. long, but then not cylindrical, and much thicker:
- Lip pectinate in the lower half, entire above:
- Rhachis much flattened with broad leaf-like wings on each side of midrib, crenulate at the margins, 1-1.5 cm. wide; bracts narrow, triangular, acuminate; pseudobulbs oblong-ovoid, sharply 4-angled, 2-7 cm. long, 1-2 cm. in diameter; leaves elliptical, 7-17 cm. long, 1.5-3 cm. broad; scape 18-40 cm. long; flowers yellow or partly or entirely purple; sepals caudate-acuminate, lateral recurved; petals glabrous, linear, curved 34. *maximum*
- Rhachis fleshy, only slightly flattened, 4-10 mm. wide; bracts almost as broad as the rhachis, ovate-triangular, obtuse; petals densely papillose, linear, curved; dorsal sepal lanceolate, acute:
- Rhachis whitish-green, flowers orange and yellow; petals nearly as long as dorsal sepal, latter 6-8 mm. long; pseudobulbs ovoid, 4-angled, 4-7 cm. long; leaves 15-18 cm. long, 2-3 cm. wide; scape 15-35 cm. long; column with a tooth on each wing just below the apex 35. *leucorrhachis*
- Rhachis purplish or blackish, flowers dull purple- or black-spotted on a green ground; petals much shorter than dorsal sepal, latter 7-11 mm. long; pseudobulbs ovoid, rather flattened, 3-angled, 3-7 cm. long; leaves 9-21 cm. long, 1-3.5 cm. wide; scape 18-65 cm. long; column-wings not toothed 36. *imbricatum*
- Lip not pectinate in the lower half:

Lip very fleshy, not much curved; lateral sepals not recurved in the upper part; rhachis slender or if slightly flattened the flowers borne on the edges; scapes up to 15 cm. long but frequently much shorter:

Petals ovate, acute, denticulate, 4 mm. long; lip dorsally flattened, papillose at the base underneath, much folded down the centre; scape slender, rhachis quite unthickened, nodding; pseudobulbs ovoid, 4-5-angled, 3 cm. long; leaves oblong, 7-9 cm. long, 1-1.5 cm. wide; sepals 5-6 mm. long, papillose 37. *denticulatum*

Petals linear, obtuse, entire, 2-3.5 mm. long; scape erect, somewhat flattened and often narrowly winged; pseudobulbs oblong-ellipsoid, 4-angled, 1.5-4.5 cm. long; leaves elliptical or oblong-elliptical, 1.5-11 cm. long, 0.5-2 cm. wide; lip with 2 prominent smooth keels in the lower part:

Lip dorsally compressed, distinctly 3-lobed at the base, the side lobes triangular-ovate and slightly incurved; sepals 2.5-3.5 mm. long

38. *fuscum*

Lip laterally compressed, side lobes reduced to very low ridges on the outside of the lip near the base; sepals 3-7 mm. long 39. *oreonastes*

Lip relatively thin and flat, often much curved, frequently with a thin longitudinal keel running along the middle of the lower surface; lateral sepals usually, and frequently abruptly, reflexed in the upper half, more or less falcate; rhachis slender or variously flattened, in the latter case with the flowers borne along the flat surfaces; dorsal sepal frequently spatulate:

Petals filiform with a thickened club-shaped apex, resembling the antennæ of a butterfly; dorsal sepal lanceolate-linear, acute, 10-12 mm. long, 1-1.3 mm. wide; pseudobulbs elongate-conical-ovoid, obscurely angled, 3-4 cm. long; leaves linear-oblong, 9-16 cm. long, 8-14 mm. wide; scape 12-18 cm. long with short loose sheaths on peduncle; rhachis swollen and more or less flattened, up to 5 mm. wide; bracts broadly ovate, nearly as wide as the rhachis; lip with erect rounded side lobes

40. *tentaculigerum*

Petals linear or oblong, obtuse or acuminate, not like antennæ:

¶ Rhachis slender, terete, scarcely or not thickened, bracts small and narrow; leaves narrow, not more than 1.5 cm. wide, usually less than 1 cm.:

Dorsal sepal more or less spatulate, obtuse or rounded; lip entire, 2-2.5 mm. long:

Scape 8-13 cm. long; leaves elliptical-oblong, 2-5 cm. long, 6-8 mm. wide; pseudobulbs ovoid or oblong, 4-angled, 1-2.5 cm. long; dorsal sepal 4-5-5.5 mm. long; petals 2-2.5 mm. long, falcate, acute 41. *Simoni*

Scape 15-40 cm. long; leaves linear or linear-oblong, 5-21 cm. long, 2-10 mm. wide; pseudobulbs narrowly ovoid, obscurely angled, 2-5 cm. long; dorsal sepal 5-5-7 mm. long; petals 1-2 mm. long, obtuse or subacute 42. *calyptratum*

Dorsal sepal not spatulate, lanceolate, acute; lip entire, 1.7-2 mm. long; Scape 3-10 cm. long, flowers closely placed; pseudobulbs ovoid, 1-2 cm. long; petals tapering to a sharply acute point:

Flowers deep purple, very close together; leaves 1.5-6 cm. long, 4-15 mm. wide; dorsal sepal 2.5-3 mm. long 43. *Rhizophorae*

Flowers yellow, not very crowded; leaves 1-3.5 cm. long, 2-4 mm. wide; dorsal sepal 4-4.5 mm. long 44. *falcipetalum*

Scape 35-55 cm. long, flowers 5-7 mm. apart; pseudobulbs elongate-ovoid, angular, 2.5-4 cm. long; petals falcate, as wide in upper half as in lower, 2 mm. long; leaves oblong-elliptical, 6-7 cm. long, 10-16 mm. wide; sepals 3-3.5 mm. long, laterals obliquely ovate, apiculate

45. *filiforme*

¶¶ Rhachis either much thickened and fleshy or expanded on each side of the midrib into a leaf-like wing:

Rhachis fleshy, somewhat flattened, not leaf-like; bracts broad, triangular-ovate, nearly as broad as the rhachis; leaves over 1.5 cm. wide; dorsal sepal linear-lanceolate, acute; petals linear, nearly as long as the dorsal sepal:

Rhachis nearly terete, 2-3 mm. wide, 3-4 cm. long; petals glabrous, subobtuse; lip ovate, obtuse, 2 mm. long; pseudobulbs ovoid, flattened, distinctly 4-angled, 6-7 cm. long, 2-2.5 cm. in diameter; leaves oblong, obtuse, 16-22 cm. long, 2-3 cm. wide; scape 18-19 cm. long; dorsal sepal 8 mm. long 46. *bibundiense*

Rhachis flattened, 6-8 mm. wide, about 10 cm. long; petals papillose, acute; lip oblong, acuminate, 3 mm. long; pseudobulbs ovoid, 3-angled, 3.5-4 cm. long, 1.5-2 cm. in diameter; leaves elliptical-oblong, 7.5-9 cm. long, 1.5-2 cm. wide; scape 27-47 cm. long; dorsal sepal 5 mm. long 47. *kamerunense*

Rhachis not very fleshy, flattened on each side of the midrib into a leaf-like wing; bracts narrow, usually much narrower than the rhachis:

Dorsal sepal linear-lanceolate, acute, 7.5–8 mm. long, 1–1.5 mm. wide in lower part; petals falcate-linear, acute, 3.5–5 mm. long, 0.3–0.6 mm. wide; pseudobulbs ovoid or oblong-ovoid, 4-angled, 2.5–5 cm. long; leaves elliptical-oblong, 5–13 cm. long, 1–2 cm. wide; scape 10–35 cm. long; rhachis up to 9 mm. wide; lip much curved; column with obtuse or subacute wings below stelidia 48. *Pobeguini*

Dorsal sepal more or less spatulate or broader above the middle, acute or obtuse; petals less than 3 mm. long:

Petals long-acute or acuminate; wings of column terminating in a rounded lobe on each side below the androclinium; ovary and sepals with many short reddish hairs:

Dorsal sepal 2.5–3.5 mm. long; rhachis 2–6 mm. wide; leaves oblong-oblancoelate, obtuse, 3.5–9 cm. long, 3–11 mm. wide; pseudobulbs narrowly ovoid, 1–3 cm. long; scape 3–7 cm. long

49. *melanorrhachis*

Dorsal sepal 4–6.5 mm. long; rhachis 5–12 mm. wide; leaves narrowly oblong or oblanceolate, 5–15 cm. long, 5–18 mm. wide; pseudobulbs ovoid, 2–4.5 cm. long; scape 5–13 cm. long 50. *velutinum*

Petals obtuse or subacute:

Wings of column terminating in a rounded lobe below the stelidia or androclinium:

Petals falcate-linear or oblong, obtuse, often somewhat thickened at the apex, 1.7–2.7 mm. long; lateral sepals 2.5–3.5 mm. wide; flowers 5–20 mm. apart, usually up to 12 mm.; pseudobulbs ovoid or elongate-ovoid, obscurely or prominently 4-angled, 2–5 cm. long; leaves oblong-oblancoelate, 4–11.5 cm. long, 6–18 mm. wide; scape up to 35 cm. long; rhachis up to 9 mm. wide; dorsal sepal 4.5–7 mm. long; stelidia of column scarcely developed

51. *falcatum*

Petals lanceolate-oblong, subacute, slightly curved, not thickened at the apex, 1.5–2.3 mm. long; lateral sepals 3–5.5 mm. wide; flowers 8–24 mm. apart, usually more than 13 mm.; pseudobulbs narrowly ovoid, 3–6 cm. long; leaves oblong-oblancoelate, 6.5–16 cm. long, 1.1–3 cm. wide; scape 10–35 cm. long; rhachis up to 15 mm. wide; dorsal sepal 5–7.5 mm. long; stelidia of column distinct, shortly subulate 52. *Bufo*

Wings of column entire, gradually merging into the column in the upper part; dorsal sepal 6–7.5 mm. long, broadly spatulate; lateral sepals about 3 mm. wide; pseudobulbs narrowly ovoid, obscurely angled, 3–6 cm. long; leaves narrowly oblong or elliptical-oblong, 10–15 cm. long, 5–18 mm. wide; scapes 20–50 cm. long; rhachis 7–15 mm. wide; petals oblong, subacute, 1.5 mm. long; stelidia shortly subulate 53. *Lindleyi*

1. *Bulbophyllum teretifolium* Schltr. in Engl. Bot. Jahrb. 38: 18.

2. *S. Nigeria*: Bibundi! Exsicc.—Schlechter 12362.

3. *B. nigripetalum* Rolfe—F.T.A. 7: 31. Sepals pale green, petals and lip blackish-purple.

Locality unknown. Exsicc.—cult. specimens.

4. *B. barbigerum* Lindl.—F.T.A. 7: 34. Flowers red.

Sierra Leone! confluence of Gbagbi and Bafi Rivers (Aug.)! *S. Nigeria*: Lagos! Insofan (Jan.)! Niger Delta (Jan.)! French Cameroons and Congo. Exsicc.—Smythe 117. Holland 297. Moloney. Dalton.

5. *B. distans* Lindl.—F.T.A. 7: 34. Sepals maroon with yellow tips; lip maroon.

Liberia: Peáhtah (Oct.)! *S. Nigeria*: Nun River (Sept.)! Exsicc.—Linder 1020. Mann 525.

6. *B. Kindtianum* De Wildem. in Not. Pl. Utiles Congo, p. 309. *B. nudiscapum* Rolfe; Cat. Talb. Nig. Pl. 146.

Sepals yellowish-green, purplish at base; lip purplish.

Sierra Leone! Liberia: Mt. Barclay (June)! Gold Coast: Nsudem! *S. Nigeria*: Eket! Oban!

Also Belgian Congo. Exsicc.—Bunting 11. Miles 23. Talb. 779; 3309.

7. *B. saltatorium* Lindl.—F.T.A. 7: 34. Flowers reddish or pink.

Sierra Leone! Gold Coast: Mansu (Dec.)! Exsicc.—cultivated specimens. Miles 31.

8. *B. calamarium* Lindl.—F.T.A. 7: 33. Sepals yellow or brownish; lip reddish-purple.

Sierra Leone! *S. Nigeria*: Nsube! ? Cameroons and Congo. Exsicc.—Barter 1482.

9. *B. phaeopogon* Schltr. in Engl. Bot. Jahrb. 38: 157; Cat. Talb. Nig. Pl. 146. Flowers yellow with purple spots.

S. Nigeria: Oban! Degema! Eket! Nyoke (July)! Victoria (May)! between Victoria and Bimbia (April)! French Cameroons. Exsicc.—Schlechter 15791. Preuss 1225. Maitland 733. Talb. 778; 3308; 3724. Winkler 14a.

10. *B. comatum* Lindl.—F.T.A. 7: 32.

Sierra Leone! Maloloka (July)! Fernando Po, 2,000 ft. (Dec.)! Exsicc.—Thomas 1299. Mann 642.

11. *B. infatum* Rolfe—F.T.A. 7: 33. Flowers yellowish-green.

Sierra Leone! Exsicc.—Cultivated specimens.

12. *B. Immschootianum* De Wildem. in Pl. Bequaert. 1: 86. *Megaclinium Immschootianum* Rolfe—F.T.A. 7: 39.

Flowers yellowish-green with brown spots.

Ivory Coast: Bouroukrou! Exsicc.—Chev. 16524.

13. *B. magnibracteatum* Summerhayes in Kew Bull. 1935, 203. Flowers dark brown.

Gold Coast: Imbraim (Oct.–Dec.)! Exsicc.—Miles 11.

14. *B. Linderi* Summerhayes in Kew Bull. 1935, 202. Flowers cream-coloured.

Liberia: Bumbuna (Oct.)! Exsicc.—Allen in Linder 1325.



FIG. 331.—*BULBOPHYLLUM BARBIGERUM* Lindl. (ORCHIDACEAE).
 A, flower. B, lip. C, column and petals. D, apex of hair from lip.

14. *B. Gustavi* Schltr. in Fedde, Repert. 9: 165. *B. aurantiacum* Hook. f.—F.T.A. 7: 30, not of F. Muell. Flowers orange.
Cameroons Mt., 5,000–6,000 ft. (Nov.)! Also French Cameroons. Exsicc.—Mann 2124.
15. *B. Schimperianum* Kraenzl. in Engl. Bot. Jahrb. 33: 71. *B. xanthoglossum* Schltr. Flower white; lip pale yellow.
S. Nigeria: Victoria (Sept.)! Moliwe (Aug.)! Cameroons Mt.: Buea (March)! Exsicc.—Schimper 341. Schlechter 17555. Deistel 54.
16. *B. Buntingii* Rendle, Cat. Talb. Nig. Pl. 99. Flowers white.
Liberia: Begwai (Oct.)! S. Nigeria: Oban! Exsicc.—Bunting 29. Talb. 935.
17. *B. Milesii* Summerhayes in Kew Bull. 1935, 200. Flowers creamy white.
Gold Coast: W. Province (Nov.–Dec.)! Exsicc.—Miles 19.
18. *B. Davidum* Lindl.—F.T.A. 7: 30. ? *B. Herminiostachys* Rchb. f.—F.T.A. 7: 35. *B. moliwense* Schltr. *B. Dralleyi* Rchb. f. Flowers yellow or purplish.
Sierra Leone! S. Nigeria: Moliwe (Aug.)! Exsicc.—cult. specimens. Schlechter 17577.
19. *B. intertextum* Lindl.—F.T.A. 7: 29. *B. viride* Rolfe; Cat. Talb. Nig. Pl. 146. *B. triaristellum* Kraenzl. & Schltr. *B. Amauryae* Rendle, Cat. Talb. Nig. Pl. 101. Flowers pale green.
Sierra Leone: Sugar Loaf Mt.! Liberia: Du River (Aug.)! S. Nigeria: Oban! Nun River (Sept.)! Moliwe (Aug.)! Exsicc.—Linder 334a. Barter. Talb. 952: 955. Mann 527. Schlechter 17556.
20. *B. coccinum* Batem. ex Lindl.—F.T.A. 7: 31. Flowers white and pink.
Sierra Leone! Liberia: Mt. Barclay (June)! Gold Coast: Accra! Exsicc.—cult. specimens. Bunting 10.
21. *B. nigritianum* Rendle, Cat. Talb. Nig. Pl. 99. Flowers pale yellow.
Sierra Leone! Liberia: Suen (Nov.)! S. Nigeria: Oban! Exsicc.—Bowden. Linder 1393. Talb. 933.
22. *B. Winkleri* Schltr. in Engl. Bot. Jahrb. 38: 158. *B. Imogeniae* K. Hamilt. Flowers greenish-white, apices of sepals reddish.
N. Nigeria: N. of Katsena River! Cameroons Mt.: Neu Tegel, near Buea (July)! Exsicc.—Winkler 157. Hamilton.
23. *B. recurvum* Lindl.—F.T.A. 7: 31. Sepals yellowish-green; lip dark red.
Sierra Leone: Sugar Loaf Mt. (April)! Njala (Aug.)! S. Nigeria: Lagos! ? St. Thomas. Exsicc.—Deighton 1148. Barter. Sc. Elliot 5778.
24. *B. pavementatum* Lindl.—F.T.A. 7: 32. *B. Dorotheae* Rendle, Cat. Talb. Nig. Pl. 100. Flowers purplish-red.
S. Nigeria: Nun River (Sept.)! Lagos! Oban! ? French Cameroons. Exsicc.—Mann 519. Talb. 934.
25. *B. porphyroglossum* Kraenzl. in Engl. Bot. Jahrb. 22: 24. *B. calabaricum* Rolfe. Sepals yellowish-green; lip dull red.
S. Nigeria: Victoria (May)! Bigundi (April)! Old Calabar! Eket! Exsicc.—Preuss 1299. Schlechter 12361. Talb. 3288. Holland.
26. *B. elaidum* Lindl.—F.T.A. 7: 29. Flowers greenish-white.
Liberia: Duport (Nov.)! Between Begwai and Peter's Town (Oct.)! S. Nigeria: Brass River! Also Princes I. Exsicc.—Barter 73; 1841. Linder 1495. Bunting 100.
27. *B. tenuicaule* Lindl.—F.T.A. 7: 27.
Fernando Po, 5,000 ft. (Dec.)! Exsicc.—Mann 648.
28. *B. gravidum* Lindl.—F.T.A. 7: 27.
Cameroons Mt., 5,000 ft. (Nov.)! Fernando Po, 3,000 ft. (Dec.)! Exsicc.—Mann 650; 2126.
29. *B. ochrolepis* Lindl.—F.T.A. 7: 28. *B. Talbotii* Rendle, Cat. Talb. Nig. Pl. 100. Sepals yellow-green; lip purple.
French Guinea: Fouta Djallon, Diaguissa and Dalaba, 3,000–4,500 ft. (Sept.–Dec.)! S. Nigeria: Oban! Bamenda, 7,200 ft.! Fernando Po, 4,000 ft. (Dec.)! French Cameroons, Uganda, Kenya Colony. Exsicc.—Chev. 18817; 20280. Talb. 931; 1268. Migeod 376. Mann 643.
30. *B. Mannii* Hook. f.—F.T.A. 7: 28.
Cameroons Mt., 4,000–5,000 ft. (Dec.)! Buea, 2,700 ft. (Jan.)! Exsicc.—Mann 1337; 2111. Schlechter 12836.
31. *B. lupulinum* Lindl.—F.T.A. 7: 28. ? *B. tetragonum* Lindl. *B. Urbanianum* Kraenzl. Flowers red or dark purple, hidden under the bracts.
Sierra Leone: Nimia (Feb.)! Nienankolia (Jan.)! Alkalla (Feb.)! S. Nigeria: Amba Bay (Feb.)! Victoria (Jan.)! Cameroons Mt.: Buea, 3,000 ft. (Jan.)! Exsicc.—Sc. Elliot 4915. Chev. 20569. Deistel 79. Mann 783. Schlechter 12844. Bunting 31.
32. *B. bifarium* Hook. f.—F.T.A. 7: 27. *B. pallens* Kraenzl. Flower bluish-rose.
S. Nigeria: between Victoria and Bimbia! Nyassosa, 2,700 ft.! Bibundi (April). Mfongu near Bagangu, 6,000 ft. (Oct.)! Cameroons Mt., 5,000 ft. (Nov.)! Buea, 3,300 ft. (Nov.)! Exsicc.—Mann 2121. Mailland 732; 781. Schlechter 12896; 12418 (not seen). Ledermann 5860.
33. *B. longibulbus* Schltr. in Engl. Bot. Jahrb. 38: 17.
S. Nigeria: Nyassosa, 2,700 ft.! Exsicc.—Schlechter 12893.
34. *B. maximum* Rchb. f. in Walp. Ann. 6: 259, excluding description. *B. ciliatum* Schltr. *Megacelinium maximum* Lindl.—F.T.A. 7: 38. *M. oxypterum* Lindl. Flowers yellow or variously purple or maroon; scape often purplish.
Sierra Leone! Liberia: Wumbi (Sept.)! Gold Coast: Mansu (Dec.)! S. Nigeria: Brass River! Kriegsschiffhafen (Sept.)! St. Thomas, Princes I., Belgian Congo. Exsicc.—Smeathman. Afzelius. Linder 827. Barter 1854. Schlechter 15758. Miles 32.
35. *B. leucorrhachis* Schltr. in Engl. Bot. Jahrb. 38: 17. *Megacelinium leucorrhachis* Rolfe—F.T.A. 7: 37. Scape pale green; flowers yellow and orange.
Sierra Leone! S. Nigeria: Lagos! Exsicc.—Smythe 114. Millen 189. Moloney.
36. *B. imbricatum* Lindl. Bot. Reg. 1841, Misc. p. 37. *B. stenorrhachis* Kraenzl. *Megacelinium imbricatum* Rolfe—F.T.A. 7: 37. *M. triste* Rolfe. Flowers blackish-purple, rarely with green markings.
Sierra Leone! Liberia: Gbanga (Sept.)! Peñtah (Oct.)! S. Nigeria: Victoria (April)! Exsicc.—Linder 669; 938. Preuss 1241. Cult. specimens.
37. *B. denticulatum* Rolfe—F.T.A. 7: 25. Sepals brownish-green; lip orange.
Sierra Leone! Exsicc.—cult. specimen.
38. *B. fuscum* Lindl.—F.T.A. 7: 24, partly. Flowers reddish-brown.
Sierra Leone! Exsicc.—cult. specimen.
39. *B. oreonastes* Rchb. f.—F.T.A. 7: 24. *B. fuscum*, Cat. Talb. Nig. Pl. 146. *B. obanense* Rendle, Cat. Talb. Nig. Pl. 101. Flowers reddish or yellowish-brown.
Sierra Leone: Sugar Loaf Mt. (May)! Liberia: Banga (Oct.)! Ivory Coast: Grabo, Cavally Basin (July)! Gold Coast! S. Nigeria: Oban, Njaji Peak (Oct.)! Iebu, Shasha Forest (May)! Cameroons Mt., 5,000 ft. (Nov.)! Buea, 3,000–5,700 ft. (April–June)! French Cameroons, Belgian Congo. Exsicc.—Sc. Elliot 4023. Barter. Linder 1249. Chev. 19696. Mann 2122. Preuss 943. Schlechter 12377. Talb. 925; 932. Richards 3457.
40. *B. tentaculigerum* Rchb. f. in Flora, 1878, 77. *B. stenopetalum* Kraenzl. *Megacelinium tentaculigerum* Rchb. f.—F.T.A. 7: 42. Flowers yellow.
Liberia: Sinoe Basin! S. Nigeria: Bibundi (April)! Victoria! Mopanza, 5,000–6,000 ft. (March). French Cameroons. Exsicc.—Johnston. Preuss 1217. Schlechter 12358. Kalbreyer (not seen).
41. *B. Simoni* Summerhayes in Kew Bull. 1935, 204. *Megacelinium lasianthum* Kraenzl. Flowers brownish.
S. Nigeria: Victoria (Feb.–April)! Exsicc.—Simon 11. Schlechter 12373.

42. *B. calyptratum* Kraenzl.—F.T.A. 7: 26. *Megacolinium lepturum* Kraenzl. Flowers greenish-white or greenish-yellow.
French Guinea: Bambaya, near Faranah (Feb.)! Gold Coast: Aburi (Nov.)! Agogo (Nov.)! S. Nigeria: Victoria (April)! Exsicc.—Chev. 20670. Johnson 217. Gillett 9. Preuss 1215. Schlechter 12369.
43. *B. Rhizophora* Lindl.—F.T.A. 7: 26. Flowers deep reddish-purple.
Gold Coast: Tarquah! S. Nigeria: Nun River! Oban! Exsicc.—Miles. Barter 20118. Talbot.
44. *B. falcipetalum* Lindl.—F.T.A. 7: 26. *Megacolinium lutescens* Rolfe. Flowers yellow.
Gold Coast! S. Nigeria: Nun River (Sept.)! Exsicc.—Mann 526. Band.
45. *B. filiforme* Kraenzl.—F.T.A. 7: 27. *B. longispicatum* Kraenzl.
S. Nigeria: between Victoria and Bimbisa (April–Sept.)! French Cameroons. Exsicc.—Preuss 1242. Schlechter 15759.
46. *B. bibundiense* Schltr. in Engl. Bot. Jahrb. 38: 155.
S. Nigeria: Moliwe (Oct.)! Exsicc.—Schlechter 15784.
47. *B. kamerunense* Schltr. in Engl. Bot. Jahrb. 38: 15, 16, fig. 6B and c.
S. Nigeria: Bibundi (April)! Exsicc.—Schlechter 12430.
48. *B. Pobeguini De Wildem.* in Pl. Bequaert. 1: 95. *B. Chevalieri* De Wildem. *Megacolinium Clarkei* Rolfe—F.T.A. 7: 41. *M. Pobeguini* Finet. Flowers greenish-yellow and variously brownish-purple.
French Guinea: Dittinn (April)! Kourassa! Banko! Ivory Coast: Bouroukrou! Gold Coast! Nigeria! Exsicc.—Chev. 12838; 16839. *Pobeguini* 636; 925. Anderson.
49. *B. melanorrhachis* Rehb. f. in Gard. Chron. 1875, 4: 162. *M. minutum* Rolfe. *M. Millenii* Rolfe—Cat. Talb. Nig. Pl. 146. *M. argenteum* Rolfe. Flowers greenish or cinnamon-yellow or variously purple.
Sierra Leone: Sugar Loaf Mts. 3,000 ft.! Liberia: Bumbuma-Moala (Nov.)! S. Nigeria: Sapoba, Jameson River (Nov.)! Lagos! Old Calabar! Oban! Eket! Exsicc.—cult. specimens. Linder 1347. Millen 189 (partly). Moloney. Sc. Elliot. Holland. Talb. 1576; 3288; 3303. Ross 230.
50. *B. velutinum* Rehb. f. in Walp. Ann. 6: 258. *Megacolinium velutinum* Lindl.—F.T.A. 7: 39. *M. melanorrhachis* Rolfe—F.T.A. 7: 41, not of Rehb. f. Flowers red or brownish.
Sierra Leone! Liberia! Banga (Oct.)! Totokwelli-Maylakwelli (Oct.)! Gold Coast: Cape Coast Castle! Ancobra River (Dec.)! Yan Kumassi (Jan.)! Kanyankor (Nov.–Dec.)! Exsicc.—Linder 1255; 1289. Johnson 855. Cummins 78; 86; 98. Miles 20.
51. *B. falcatum* Rehb. f. in Walp. Ann. 6: 258. *B. leptorrhachis* Schltr. *Megacolinium falcatum* Lindl.—F.T.A. 7: 41. *M. endotrachys* Kraenzl.—Stapf 654. Flowers yellow and reddish-purple; rhachis green or reddish.
Sierra Leone: Njala (Nov.)! Liberia: Begwai (Oct.)! Grand Bassa! Gold Coast: Kanjankor (Nov.–Dec.)! Togo: Hohoe, Ntmadua, 1,000–2,250 ft. (Nov.)! S. Nigeria: Lagos! Moliwe, 800 ft. (Jan.)! St. Thomas, Uganda. Exsicc.—Deighton 2569. Edwards. Dinklage 1852. Bunting 25. Miles 21. Moloney. Schlechter 12892. Thompson 1607.
52. *B. Bufo* Rehb. f. in Walp. Ann. 6: 258. *B. Bakosorum* Schltr. *Megacolinium Bufo* Lindl.—F.T.A. 7: 43. *M. Deistellianum* Kraenzl. Flowers greenish-rose, speckled purple.
Sierra Leone! Liberia: near Peter's Town (Oct.)! Banga (Oct.)! Gold Coast: S. Nigeria: Nyassoso, 2,700 ft. (Jan.)! Cameroons Mt.: Buca! Exsicc.—Bunting 102. Linder 1179; 1209; 1210. Deistel. Schlechter 12898.
53. *B. Lindleyi* Schltr. Die Orchid. 327. *Megacolinium Lindleyi* Rolfe—F.T.A. 7: 43. Flowers yellowish-green, speckled with brown.
Sierra Leone! S. Nigeria: Eket! Exsicc.—cult. specimens. Talb. 3302.

31. GENYORCHIS Schltr. in Engl. Bot. Jahrb. 38: 11.

Pseudobulbs 2-leaved, scarcely flattened:

Mentum of flower helmet-shaped, upper margin of lateral sepals nearly twice as long as lower margin; lip about 2.5 mm. long, much longer than broad, recurved front lobe very narrow 1. *pumila*

Mentum of flower rounded, margins of lateral sepals equal; lip 1 mm. long, much broader than long when flattened out, recurved front lobe very broad 2. *micropetala*

Pseudobulbs 1-leaved, flattened; mentum helmet-shaped, upper margin of lateral sepals somewhat longer than the lower margin; lip 3 mm. long, longer than broad, recurved front lobe narrow 3. *platybulbon*

1. *G. pumila* Schltr. in Engl. Bot. Jahrb. 38: 11. *Polystachya bulbophyllioides* Rolfe—F.T.A. 7: 131.
Sierra Leone: Bagroo River! Benkia, Port Loko Creek (March)! S. Nigeria: Brass River! Cameroons and Congo. Exsicc.—Mann. Glanville 1816. Barter 72.
2. *G. micropetala* Schltr. l.c. *Polystachya micropetala* Rolfe—F.T.A. 7: 131.
Fernando Po, 4,000 ft. (Dec.)! Exsicc.—Mann 644.
3. *G. platybulbon* Schltr. in Engl. Bot. Jahrb. 38: 155.
S. Nigeria: Moliwe! Exsicc.—Stammler.

32. EULOPHIDIUM Pfitz. Entw. Nat. Anord. Orch. 87.

Pseudobulbs ovoid, 2–3.5 cm. long; leaves variously petiolate, oblong-oblancoleate, acute, 15–40 cm. long, 2.5–5.5 cm. wide, greyish-green with transverse irregular bands of darker green spots or blotches; scape 20–40 cm. high, simple or with 1 or 2 short branches at the base; bracts lanceolate, acuminate; flowers greenish-white with pink blotches on the lip; sepals 7–13 mm. long; petals slightly shorter than dorsal sepal; lip 3-lobed, 7–9 mm. long, the side lobes erect, rounded, rather incurved, the middle lobe much longer, deeply divided into 2 rounded parts, lip with 2 diverging quadrate keels at the base; spur much swollen, 4–5 mm. long *Ledenii*

- E. Ledenii* De Wildem. in Ann. Mus. Congo, Ser. V. 1: 115. *E. Warneckeanum* Kraenzl. *Eulophia Ledenii* Stein—F.T.A. 7: 50.
Sierra Leone: Njala (Aug.)! Gold Coast: Ashanti! Togo: near Lome (July)! S. Nigeria: Ukungu! Also St. Thomas, Belgian Congo and Zanzibar. Exsicc.—Deighton 2208. Thomas 2196. Warnecke 196.

33. EULOPHIA R.Br. (includ. *Lissochilus* R.Br.)—F.T.A. 7: 47, 70.

Spur 1.5–3 cm. long, very slender; sepals and petals similar, green or brownish, lanceolate, acute, spreading and somewhat reflexed, 2–3 cm. long; lip 3-lobed, 2–4 cm. long, without calli, pink, side lobes small, middle lobe much larger, obovate



FIG. 332.—*BULBOPHYLLUM FALCATUM* Rchb. f. (ORCHIDACEAE).
A, flowering plant. B, flower. C, column.

to suborbicular, acute to retuse; scape 40-90 cm. high; leaves up to 45 cm. long, 4-13 cm. broad 1. *guineensis*
 Spur up to 1.5 cm. long, usually less than 1 cm., if over 1 cm. then very wide in lower part :

Lip truncate, shorter than the spur, the front margin longly ciliate, callus tooth-like near margin in centre; leaves opening with flowers, lanceolate, 1-5 cm. broad; scape 40-95 cm. high, laxly many-flowered; sepals lanceolate, acute, 10-12 mm. long; petals similar but smaller; spur clavate at the apex, widened at the base, 8 mm. long 2. *gracilis*

Lip not truncate, usually considerably longer than the spur, margin sometimes slightly toothed but never ciliate :

Pseudobulbs very narrowly cylindrical, 8-15 cm. long, about 1 cm. in diameter, 2-leaved at apex; leaves with long slender petioles; blades ovate or lanceolate, abruptly narrowed to the petiole, 10-25 cm. long, 3.5-8 cm. broad; scape simple or slightly branched, 45-70 cm. high; sepals oblanceolate, obtuse, 1 cm. long; petals shorter and broader; lip almost equally 4-lobed, lobes rounded, disc with a concave more or less retuse callus at the base; spur 4 mm. long 3. *Saundersiana*

Pseudobulbs fusiform with several leaves, or stem consisting of underground tubers; leaves linear or lanceolate, gradually tapering into the petiole :

Bracts broad from a much narrower base, apiculate to acuminate in the upper part, over 1 cm. long and 7-30 mm. wide; scapes 1-2 m. high; leaves at least 3 cm. wide :

Petals much longer and broader than the sepals, 2.5-3 cm. long, suborbicular; sepals spatulate-oblong, 1.5-2 cm. long, 5-7 mm. broad; spur more or less inflated underneath in the lower part, suddenly narrowed near the apex; bracts obovate, apiculate; lip about 3 cm. long, 3-lobed; side lobes rounded, middle lobe ovate, obtuse; disk with 3 rather short keels in the centre

4. *oedoplectron*

Petals very little longer than or equal to the sepals :

Lip indistinctly 3-lobed, 2.5-3.5 cm. long and broad, front lobe much broader than long, disk with 3-5 keels; sepals obovate, obtuse, 2.5-3 cm. long, 1-1.5 cm. broad; spur conical with a narrow upcurved apex; bracts 2-5 cm. long, 1.5-2.5 cm. broad; petals not much spreading, orbicular 5. *latilabris*

Lip distinctly 3-lobed, front lobe longer than broad or length and breadth about equal; disk with 3 keels, semicircular at the base and running out into crenulate lamellae in front :

Sepals oblanceolate or obovate, apiculate or shortly acuminate, much narrowed in the lower part, 1.7-2.7 cm. long; lip 2-4 cm. long, 1.6-4 cm. wide across the side lobes 6. *Horsfallii*

Sepals oblong-oblanceolate, obtuse, not much narrowed in the lower part, 1.3-1.7 cm. long; lip 1.6-2.5 cm. long, 1.5-2.5 cm. wide across the side lobes

7. *Barteri*

Bracts tapering from the base or just above, usually linear-lanceolate and long-acuminate, or if broader less than 1 cm. long :

*Sepals sharply reflexed, in most species markedly different from the petals in shape and colour :

Sepals more or less spatulate, widest near the rounded apex, 1.3-2.1 cm. long; petals elliptical or oblong-elliptical, about as long as the sepals and 2-3 times as wide; scapes 0.5-1.5 m. high; lip indistinctly 3-lobed, side lobes broad, rounded :

Petals white to red; leaves very narrow, 5-15 mm. wide; central veins of lip bearing numerous short hair-like outgrowths and 3 low keels towards the base 8. *caricifolia*

Petals yellow; leaves broader, 12-45 mm. wide; lip with 3 semicircular keels in the centre and 3 lower ones at the base 9. *Lindleyana*

Sepals not wider at the apex than below, obtuse or acuminate :

Flowers yellow, petals with reddish veins; sepals 6-12 mm. long, obovate-elliptical, shortly acuminate; petals ovate-orbicular, 12-16 mm. long and almost as wide; lip pandurate-trilobed, 16-21 mm. long, basal lobes rounded, united partly to the column, front lobe elliptical with 5 keels along the centre, the 2 outer ones smaller than the others; spur narrow, upcurved; leaves more or less terete, less than 5 mm. in diameter 10. *involuta*

Flowers various shades of pink or mauve; sepals 14-33 mm. long :

Sepals and petals similar, more or less oblong, the latter a little broader; lip relatively narrow, 1.3-2.2 cm. long, trilobed, the middle lobe elliptical or elliptical-ovate, disk with 2 semicircular entire keels towards the base and 5-7 much-broken-up keels in front; spur narrowed into an acute somewhat upturned apex; leaves narrowly lanceolate, 2-6 cm. wide, appearing after the leaves 11. *cristata*

Sepals and petals very dissimilar, the latter much wider, broadly elliptical or

almost orbicular; lip broad, 1.9-3.4 cm. long, trilobed, the middle lobe more or less bilobed or markedly retuse; spur very blunt and rounded:

Lip with no calli, front lobe with a distinct narrow claw; sepals more or less oblong, obtuse; petals retuse at the apex; leaves appearing after the flowers 12. *Buettneri*

Lip with 2 erect narrow quadrate calli in the centre and the veins just in front variously keeled and/or with small horn-like outgrowths, front lobe not much narrowed at the base; petals rounded or minutely apiculate at the apex:

Leaves appearing after the flowers, linear, up to 1.5 cm. broad

13. *cucullata*

Leaves appearing with the flowers, lanceolate, 2.5-6 cm. broad

14. *dilecta*

**Sepals more or less connivent or somewhat spreading, not reflexed, in most species very similar to the petals in shape and colour:

A leafless pale yellow saprophyte; underground stem rather thin, fleshy, with numerous obtuse scale-leaves and semiglobose whitish tubercles (? arrested roots); scape 10-25 cm. high, up to 5-flowered; sepals and petals oblanceolate, 1.5-2.5 cm. long; lip 3-lobed, 1.5-2 cm. long, side lobes very small, rounded, middle lobe much larger, emarginate, lip covered in the front part with small purplish papillae 15. *galeoloides*

Plants with leaves, which may expand after the flowers; stems fleshy tubers or pseudobulbs:

†Sepals 4-12 mm. long; leaves in most species not expanding until after flowering:

Inflorescence paniculate; scape 40 cm. high; no leaves at time of flowering;

bracts very short; sepals narrow, acute, about 7 mm. long; petals similar,

a little shorter; lip 3-lobed, 6-7 mm. long, side lobes obtuse, middle lobe

orbicular, disk with 5 slightly rough keels; spur 2 mm. long

16. *Elliotii*

Inflorescence racemose:

Calli of lip consisting of verrucose thickenings, not of hairs; sepals 4.5-7 mm.

long, rather spreading, oblong-oblanceolate, apiculate; scapes 30-35 cm.

high; racemes elongated, many-flowered, 15-25 cm. long; leaves appearing

after the flowers:

Petals elliptical, as long as the sepals; side lobes of lip small, triangular,

not diverging much from the much larger orbicular front lobe; calli

thickenings transversely arranged; spur 1 mm. long 17. *sordida*

Petals ovate-orbicular, distinctly shorter and much broader than the sepals;

side lobes of lip oblong, much diverging from the oblong-elliptical front

lobe and united to the foot of the column in the lower half; calli thickenings

quite irregularly arranged; spur 4-4.5 mm. long 18. *leonensis*

Calli of lip consisting mainly of hair-like outgrowths:

Petals about half to two-thirds as long as the sepals, narrowly elliptical;

sepals narrowly oblanceolate, subacute, 8-9 mm. long; lip 3-lobed, side

lobes very small, more or less incurved, middle lobe elliptical, much larger;

spur swollen at the end, about 3 mm. long; raceme lax, 6-12-flowered,

bracts very small. 19. *brevipetala*

Petals about the same length as the sepals:

Raceme short (3-7 cm. long), dense; peduncle completely encased in over-

lapping chaffy brown sheaths; bracts similar, longer than the pedicels;

sepals and petals very similar, ovate, 9-12 mm. long; lip 3-lobed, side

lobes triangular, middle lobe oblong, disk with 2 thickened keels below

the hairy veins; leaves 7-17 mm. wide 20. *propinqua*

Raceme relatively long, lax; sheaths of peduncle not overlapping; sepals

narrow or oblong-lanceolate:

Sepals linear-ligulate, acute, 1 cm. long; petals ligulate, a little shorter

and broader; lip side lobes obtusely triangular, middle lobe obovate,

lip about 9 mm. long; raceme 15 cm. long 21. *movile*

Sepals oblong or oblong-lanceolate, 4-7 mm. long; petals similar; lip

3-lobed, middle lobe rectangular or slightly wider in front, emarginate,

margins irregular, veins bearing numerous hair-like outgrowths:

Side lobes of lip not diverging from middle lobe; disk with thickened

callus or calli; spur 2-4 mm. long, rather slender 22. *lutea*

Side lobes of lip divergent; disk without thickened calli but 3 central

veins only slightly thickened; spur about 1.5 mm. long, slightly

widened at the apex 23. *Milnei*

††Sepals 13-29 mm. long:

Spur represented by a broad rounded sac; lip bearing 2 quadrate calli in the

centre and hairs on the veins of the broadly ovate or semiorbicular middle

lobe; petals a little shorter and broader than the sepals; leaves lanceolate,

3-10 cm. wide, appearing with the flowers; scape 40-100 cm. high, many-

flowered, bracts very narrow 24. *longifolia*

Spur with a narrow horn-like apex :

Leaves more or less well-developed at the time of flowering, 1.5-6 cm. broad ;
lip 12-15 mm. long :

Leafy stems thickened at base to form tall cylindrical somewhat tapering
green pseudobulbs ; lip elliptical in general outline, side lobes small,
triangular, middle lobe ovate, crenulate, central nerves thickened to
form 2-3 low keels ; spur 6-8 mm. long, wider at the apex ; scapes
40-200 cm. high ; raceme 20-40 cm. long 25. *euglossa*

Leafy stems thickened only at the very base ; lip nearly as broad as long,
side lobes large, rounded, middle lobe nearly orbicular, disk and front
lobe with 3-5 verrucose keels sometimes bearing hair-like outgrowths ;
spur 3-4 mm. long, tapering towards the apex ; scapes 30-60 cm. high ;
raceme 10-20 cm. long 26. *stachyodes*

Leaves scarcely developed at time of flowering, apparently less than 1 cm.
broad ; plants with irregular tubers :

Flowers green with brownish or purple markings on lip ; petals oblong,
narrower than the sepals ; sepals 13-18 mm. long ; lip 10-17 mm. long,
disk with 2 low keels, veins of front lobe bearing short hairs or much-
interrupted keels 27. *adenoglossa*

Flowers pale yellow or cream-coloured with sometimes the veins of the lip
purplish ; petals oblong-elliptical, broader than the sepals ; sepals 17-29
mm. long ; lip 20-27 mm. long, the orbicular crenulate middle lobe with
5-9 low verrucose keels 28. *Millsoni*

1. *Eulophia guineensis* Lindl.—F.T.A. 7: 69.
Gambia : Kudang (June) ! Sierra Leone : Njala (Nov.) ! York Pass ! Yonibana (Nov.) ! Gold Coast :
Aburi (Nov.) ! Tanosu (Jan.) ! Akropong, Akwapim ! Kjebl, Asiawka Birrimas (Oct.) ! N. Nigeria :
Bauchi Plateau (June) ! Sherifuri (May-June) ! Tilde Filani, 3,300 ft. (May) ! Zungeru (June) ! Nupe !
Vom, 3,000-4,500 ft. ! Nell's Valley, Naraguta (June) ! S. Nigeria : Lagos ! between Abo and Iddah !
Eket ! Degema ! Also Congo, Angola, Uganda, Kenya, Abyssinia. Exsicc.—Brooks 58. Deighton 2405.
Lane-Poole 455. Thomas 4676. Irvine 800 ; 2608. Chipp 70. Johnson 220. Vogel 1. Millen 186.
Barter 1485. Daltz 234. Lely 232 ; 257 ; P 725. Thornehill 169. Kitson. Tab. 3650.
2. *E. gracilis* Lindl.—F.T.A. 7: 51. *E. virens* Chev. Bot. 614. Flowers green.
Sierra Leone : Njala (May) ! Bumban-Lokko (April) ! Bagroo River (April) ! Nlawama (May) !
Sugar Loaf Mt. (Sept.) ! Liberia : Sinoe River ! Ganta (May) ! Jui, Gola Forest (April) ! Grand Bassa,
Begnai (Oct.) ! Ivory Coast : between Bingerville and Potou Lagoon (Feb.) ! S. Nigeria : Lagos, Apapa
(Jan.) ! Degema ! Eket ! Oban ! Duala (Feb.) ! Exsicc.—Deighton 680. Smythe 55. Sc. Elliot 5732 ;
5783. Mann 903. Bunting 48 ; 154. Chev. 20077. Daltz 1284 ; 8151. Tab. 313.
3. *E. Saundersiana* Rehb. f.—F.T.A. 7: 50. Flowers green with purplish-black markings.
Ivory Coast : Bourokrrou (Dec.-Jan.) ! Gold Coast : Assin Yan Kumasi ! Aburi (Dec.) ! Miroviam
(Jan.) ! S. Nigeria : Lagos ! British Cameroons ! Oban ! Exsicc.—Chev. 16905. Cummins 222. Johnson
219. Chipp 668. Millen 150. Preuss 96. Tab. 924.
4. *E. oedoplectron* Summerhayes in Kew Bull. 1936: ined. *Lissochilus macranthus* Lindl.—F.T.A. 7: 86.
L. elatus Rolfe, l.c. 87.
? S. Nigeria : Bonny ! Also French Cameroons and Gabon. Exsicc.—Shepherd 6.
5. *E. latilabris* Summerhayes in Kew Bull. 1936: ined. *Lissochilus Schweinfurthii* Rehb. f.—F.T.A. 7: 88.
Flowers pink and white.
N. Nigeria : Vom, Bauchi Plateau, 3,000-4,500 ft. ! Also French Cameroons, Belgian Congo, Uganda,
Tanganyika. Exsicc.—Dent Young 236a.
6. *E. Horsfallii* Summerhayes, comb. nov. *Lissochilus Horsfallii* Batem.—F.T.A. 7: 84. *L. roseus* Lindl.
l.c. 85, in part ; Stapf 654. Flowers white or pink and purple.
Sierra Leone : Port Lokko (April) ! Tarvia (Jan.) ! Yagba, Samu (Dec.) ! Yataya (Sept.) ! Liberia :
Kakatown ! Sinoe River ! Du River (Aug.) ! Gbanga (Sept.) ! Ganta (April) ! Dukwai River (Oct.) !
Nov. ! Mt. Barclay (July) ! Peter's Town (Oct.) ! Ivory Coast : Douanaé, 1,200 ft. (June) ! Gold Coast :
Oda (Aug.) ! Aburi (April) ! Niru (Nov.) ! Manon (Dec.) ! Dahomey : Porto-Novo (Jan.) ! N. Nigeria :
Vom, Bauchi Plateau, 3,000-4,500 ft. ! Munshi (June) ! Kabbo (Oct.) ! Zungeru and Lokoja ! S. Nigeria :
Oye and Ado River (Jan.) ! Eket ! Newi (Jan.) ! Alsho (Feb.) ! Lagos ! Fernando Po : Moka, 4,000-
5,000 ft. (Jan.) ! Also French Cameroons, N. Rhodesia, Portuguese E. Africa. Exsicc.—Thomas 2425 ;
8957 ; 9664. Sc. Elliot 4297 ; 4472 ; 5744. Linder 299 ; 359. Cooper 35. Collett 49. Howes 969.
Vigne 2574. Chev. 22724. Dent Young 236. Daltz 834. Millen 99 ; 170 ; 171. Barter 80. Ezell 760.
Tab. 3003 ; 3020. Bunting 168.
7. *E. Barteri* Summerhayes in Kew Bull. 1936: ined. *Lissochilus roseus* Rolfe, F.T.A. 7: 85, in part. Flowers
lilac or reddish-purple.
Sierra Leone : Mapaki (Aug.) ! Glemu (Nov.) ! Bobolu (June) ! Ivory Coast : Touba Férédougoua
River (July) ! Gold Coast : Kintampo, 1,100 ft. (July) ! N. Nigeria : Nupe ! Sare ! Exsicc.—Deighton
364 ; 1213. Palmer 607. Smythe 57. Collett 66. Barter 1481 ; 3429. Vigne 3935.
8. *E. caricifolia* Summerhayes, comb. nov. *Lissochilus caricifolia* Rehb. f.—F.T.A. 7: 77. *L. longifolius*
Benth. l.c. ; Stapf 654.
Sierra Leone : between Blama and Sendumi (March) ! Mano Salija (Feb.) ! Gengaru (March) ! Falaba
(April) ! Liberia : Grand Bassa, Sinoe River ! (July) ! Mt. Barclay (May) ! Gold Coast : Asientiem
(July) ! Atwabo ! S. Nigeria : Udi (April) ! Ikoyi (May) ! Eket ! Also Uganda and Tanganyika.
Exsicc.—Dawe 460. Deighton 432 ; 1626. Lane-Poole 325. Vogel 8. Chipp 284. Fishlock 55. Daltz 964.
Tab. 3160 ; 3336. Kitson. Bunting 4 ; 35.
9. *E. Lindleyana* Schltr. in Westafrik. Kautsch.-Exped. 279. *Lissochilus Lindleyanus* Rehb. f.—F.T.A. 7: 77.
L. paludiculus Rehb. f.
French Guinea : Kouria (June-Aug.) ! Ditinn (Sept.) ! Sierra Leone : Mabun (Aug.) ! Gbinti (July) !
Njala (June-July) ! Ivory Coast : Sassandara Valley, Orodougou (June) ! Férédougoua River, Touba
(July) ! Mankono (July) ! Gold Coast : Ejuba, 2,380 ft. (June) ! Dahomey : Porto-Novo (Jan.) ! N.
Nigeria : Zaria (Aug.) ! Kilba (Aug.) ! Nupe ! S. Nigeria : Degema, Ahoadia (Aug.) ! Also Sudan,
Kenya, Uganda and Tanganyika. Exsicc.—Pobéguin 1681. Caille 14948. Chev. 18522 ; 21831 ; 22005 ;
22724b. Thomas 1539. Deighton 1169 ; 2511 ; 2525. Collett 64. Lamb 61. Daltz 219. Barter 1486.
Tab. 3804. Yates.
10. *E. involuta* Summerhayes in Kew Bull. 1936: ined. *Lissochilus Smithii* Rolfe—F.T.A. 7: 96.
Ivory Coast : Mankono (July) ! Gold Coast : Anum Plains (Aug.) ! N. Nigeria : Vom, Bauchi Plateau,
3,000-4,500 ft. ! S. Nigeria : Jua, Bamenda, 3,000 ft. (April) ! Also Tanganyika. Exsicc.—Johnson 1094.
Dent Young. Maitland 1778. Chev. 21977.



FIG. 333.—*EULOPHIA GUINEENSIS* Lindl. (ORCHIDACEAE).

A, column. B, anther (from above). C, same (from below). D, pollinia.

11. *E. cristata* Steud., Nom. Bot. ed. II, 1: 605. *Lissochilus purpuratus* Lindl.—F.T.A. 7: 79. *L. Heudelotii* Rehb. f. l.c. 80. *L. uliginosus* Rolfe.
Distributed everywhere from Gambia to British Cameroons. Also French Cameroons, Congo, Sudan, Uganda. Exsicc.—Brooks 30; 87. *Heudelot*. Sc. Elliot 5047. *Thomas* 10327. *Deighton* 1117. *Warnecke* 96. *Johnson* 850. *Chipp* 192. *Dalziel* 164; 235; 287; 842. *Hoves* 1134. *Chev.* 23014. *Lely* 81; P 246. *Vogel* 75. *Millson* 24. *Barter* 1859. *Rouland* 21. *Schlechter* 12351. *Bunting* 32. (See Appendix).
12. *E. Buettneri Summerhayes*, comb. nov. *Lissochilus Buettneri* Kraenzl.—F.T.A. 7: 84.
Sierra Leone: Falaba (March)! Gold Coast: Afram Plains (March)! Togo: Bismarckburg, Angouje Steppe (Feb.)! Kpandu (Feb.)! Exsicc.—Sc. Elliot 5144. *Johnson* 852. *Büttner* 415. *Robertson* 125.
13. *E. cucullata* Steud., Nom. Bot. ed. II, 1: 605. *Lissochilus arenarius* Lindl.—F.T.A. 7: 82.
Gambia: Aboku (June)! French Guinea: Bonhouri (July)! Doumé (July)! Sierra Leone: Sendugu (June)! Pendembu (July)! Port Lokko (June)! Ivory Coast: Baoulé-Nord (Aug.)! Gold Coast: N. Ashanti (Nov.)! Nikoranza (April)! Dahomey: Porto-Novo (Jan.)! N. Nigeria: Keana, Nassarawa (May)! Aguiji, near Ilorin! Lokoja (April)! Maizoni, Bornu! Bauchi Plateau (May)! Zungeru (May-Aug.)! Zaránda Filani (July)! Vom, 3,000–4,500 ft.! Lemme (May)! Nupe! S. Nigeria: Ikoni! Borgu Barbe! Niger Estuary! Eastwards to Sudan and Kenya, southwards to Angola and Portuguese East Africa. Exsicc.—Brooks 59. *Chev.* 22234; 22724 ter. *Thomas* 581; 776. *Lely* 156; 199; P 283. *Dalziel* 230. *Barter* 1488. *Baikié*. *Bunting* 54.
14. *E. dilecta Schlecht.* in Westafrik. Kautschsk.-Exped. 279. *Lissochilus dilectus* Rehb. f.—F.T.A. 7: 83.
Togo: between Golokuati and Kpandu (Aug.)! N. Nigeria: Okwoga to Idah (July)! S. Nigeria: Ogoja! Also Cameroons and Angola. Exsicc.—Rüsen. *Talbot*. *Gillet* 64.
15. *E. galeoloides Kraenzl.* in Engl. Bot. Jahrb. 24: 508.
Gold Coast: Tano-Ofin (Feb.)! Also Tanganyika. Exsicc.—Lyon in Vigne 2874.
16. *E. Eliottii Rolfe*—F.T.A. 7: 54.
Sierra Leone: Falaba (March)! Exsicc.—Sc. Elliot 5116.
17. *E. sordida Kraenzl.* in Engl. Bot. Jahrb. 23: 69. Flowers yellow and brownish.
Gold Coast: Abilingke, Achimota (Feb.)! Togo: Lome (March)! Exsicc.—Warnecke 95. *Irvine* 1368; 1999.
18. *E. leonensis Rolfe*—F.T.A. 7: 51.
French Guinea: between Boulivet and Toukan (April)! Sierra Leone: Bafodeya (April)! N. Nigeria: Vom, Bauchi Plateau, 3,000–4,500 ft.! Also Uganda. Exsicc.—Chev. 12942. Sc. Elliot 5536. *Dent Young*.
19. *E. brevipedata Rolfe*—F.T.A. 7: 53. *Lissochilus ? tenuissimus* Chev. Bot. 616.
French Guinea: Valley of the Kaba (May)! Sierra Leone: Falaba (March)! Exsicc.—Chev. 13179. Sc. Elliot 5224.
20. *E. propinqua Hutchinson* in Kew Bull. 1921, 410. *E. baoulensis* Chev. Bot. 618. Flowers yellow with brown or purple markings.
Sierra Leone: Kasokora (Aug.)! Ivory Coast: Baoulé (July)! N. Nigeria: between Hephem and Ropp, 4,600 ft. (July)! Vom, 3,000–4,500 ft.! S. Nigeria: Ogoja! Bamenda, Bum to Uchan, 4,000–5,000 ft. (June)! Also Virunga Mts. and Kenya. Exsicc.—Deighton 1234. *Chev.* 22175. *Lely* 353; P. 382. *Dent Young* 233. *Maitland* 1638.
21. *E. monile Rehb. f.*—F.T.A. 7: 53. Flowers greenish-white.
N. Nigeria: Keana! Also Angola. Exsicc.—Hepburn 55.
22. *E. lutea Lindl.*—F.T.A. 7: 52; Chev. Bot. 614. *E. pusilla Rolfe*. *E. microdactyla* Kraenzl. *E. Warneckeana* Kraenzl. Flowers whitish to orange-yellow.
French Guinea: Beyla (March)! Siredougou (April)! Sierra Leone: Herimankuna (March)! Gold Coast: Afram Plains (March-May)! Sesiama (Feb.)! Togo: Lome (May)! Badja (June)! N. Nigeria: Kontagora! Nupe! Also French Cameroons, Sudan, Uganda, Tanganyika. Exsicc.—Chev. 20876. *Collenette* 1. Sc. Elliot 5248. *Johnson* 853. *Warnecke* 328. *Burbridge* 245. *Schlechter* 12971. *Dalziel* 446. *Barter* 1480.
23. *E. Milnei Rehb. f.*—F.T.A. 7: 52.
S. Nigeria: Old Calabar! Also French Cameroons and Spanish Guinea. Exsicc.—Robb.
24. *E. longifolia Schlechter*, Die Orchid. 347. *E. Woodfordii Rolfe*, F.T.A. 7: 68. Flowers green and purple.
Gold Coast! S. Nigeria: Lagos! Old Calabar (Aug.)! Eket! Eastwards to Sudan and Uganda, southwards to Angola and Rhodesia, and in tropical America. Exsicc.—Burton. *Millen*. *Talb.* 3356.
25. *E. englossa Rehb. f.*—F.T.A. 7: 57; Cat. Talb. Nig. Pl. 146; Chev. Bot. 613. Tepals greenish, lip white with pink or purple veins.
Sierra Leone: Sugar Loaf Mt. (May)! Ivory Coast: Mt. Goula, Danané, 1,200 ft. (April)! Gold Coast: Aburi (July)! Benu (Aug.–Dec.)! S. Nigeria: Oban! Also French Cameroons and Uganda. Exsicc.—Van Hees. *Barter*. *Chev.* 21228. *Johnson* 1065. *Miles* 3. *Talb.* 162.
26. *E. stachyodes Rehb. f.*—F.T.A. 7: 58. *E. Lambii Rolfe*. Flowers brown and white.
N. Nigeria: Bauchi Plateau (June)! Vom, 3,000–4,500 ft.! S. Nigeria: Bamenda, Uchan, 5,000 ft. (June)! Basenako, 5,000 ft. (June)! Also French Cameroons, Belgian Congo, Sudan and Uganda. Exsicc.—Lamb. *Dent Young*. *Maitland* 1507; 1783.
27. *E. adenoglossa Rehb. f.*—F.T.A. 7: 59.
N. Nigeria: Nupe! Kontagora (June)! Keana, Nassarawa (May)! Banda, 2,000 ft. (June)! Exsicc.—Barter. *Dalziel* 562. *Hepburn* 23; 61; 123.
28. *E. Millsoni Summerhayes*, comb. nov. *Lissochilus Millsoni* Rolfe—F.T.A. 7: 79. *L. Andersoni* Rolfe. *L. Johnsoni* Rolfe. *L. laticus* Kraenzl. *Eulophia tuberifera* Kraenzl.
Ivory Coast: Adioukrou, Dabou (Feb.)! Gold Coast: Accra Plains (Jan.–April)! Achimota (May)! Afram Plains (March)! Aburi! Togo: Misahöhe (March)! N. Nigeria: many localities (April–June)! S. Nigeria: Ilorin! Ikir! Bamenda, Jua, 3,500 ft. (April)! Also French Cameroons, Chari, Belgian Congo, Sudan, Uganda. Exsicc.—Portères 618. *Chev.* 17119. *Hoves* 1193. *Irvine* 1614. *Dalziel* 165; 286; 446; 841; 8256. *Millson*. *Maitland* 1626. *Lely* P 253; 839. *Johnson* 851; 854. *Baumann* 24. (See Appendix).

34. EULOPHIOPSIS Pfitz. Entw. Naturl. Anordn. Orchid. 105.

Pseudobulbs cylindrical-fusiform or conical-ovoid, 3–9 cm. long, 1–3 cm. in diameter, 4–6-leaved; leaves lanceolate, up to 40 cm. long and 3–5 cm. wide; inflorescence appearing before the leaves, 15–50 cm. high, branches spreading; flowers yellow and brown; sepals spatulate-oblong, about 5–6 mm. long; petals elliptical, a little shorter; lip 3-lobed, middle lobe more or less retuse or bifid, disk of lip with 2 keels at the base; spur sharply bent forward, nearly as long as the lip; column with a hairy auricle on each side at the base *lurida*

E. lurida Schltr. Die Orchid. 348. *Eulophia lurida* Lindl.—F.T.A. 7: 53; Cat. Talb. Nig. Pl. 146; Stapf 654.
French Guinea: N'Zo (March)! Kindia! Bambaya, Faranah (Feb.)! Sierra Leone: Nima (Feb.)! Bumban to Port Lokko (April)! Heddle's Farm (Feb.)! Njala (Jan.)! Mt. Aureole (Feb.)! Liberia: Kaka Town! Monrovia! Ivory Coast: Bouroukrou (Jan.)! Gold Coast: Dunkwa (Jan.)! Kumasi (Dec.)! Aburi (Jan.)! S. Nigeria: Lagos! Nun River! Brass River! Oban! Amba Bay (Feb.)!



FIG. 334.—*EULOPHIA CUCULLATA* Steud. (ORCHIDACEAE).
A, fruit. (The sepals should be sharply reflexed.)

FIG. 335.—*EULOPHIA LUTEA* Lindl. (ORCHIDACEAE).

A, scape. B, leaf. C, dorsal sepal. D, lateral sepal. E, petal. F, lip and column (side view). G, lip with spur removed (front view). H, column.

Also French Cameroons, Congo and Uganda. Exsicc.—*Chev.* 16916; 20670; 21049. *Jacques* 10. *Sc. Elliot* 4812; 5741. *Don. Thomas* 2566; 9088. *Deighton* 2460. *Whyte. Dulz.* 77; 1020. *Vigne* 1522. *Johnson* 218. *Barter* 2040; 20121. *Mann* 982. *Talb.* 772.

35. RHIPIDOGLOSSUM Schltr. in Beih. Bot. Centralbl. 36, II. : 80.

Spur 2 or more times as long as the lip, not or hardly swollen towards the apex; lateral sepals 3–4 mm. long:

Lip longer than broad, 3–3.5 mm. long, quadrate, truncate in front, slightly emarginate with sometimes a small apiculus in the sinus, margins irregular; spur 11–13 mm. long, very slender; viscidia more than half as long as stipites; leaves 9–14 cm. long, 6–16 mm. wide, acute 1. *longicalcar*

Lip broader than long, about 2.5–3 mm. long, 3–4.5 mm. wide, flabellate-elliptical, obscurely 3-4-lobed in front; spur 5–7.5 mm. long; viscidia very small, much less than half as long as stipites; leaves 6–13 cm. long, 10–20 mm. wide, unequally and obtusely bilobed 2. *rutilum*

Spur only slightly longer than the lip, distinctly swollen in the apical part; lateral sepals 2 mm. long; lip transversely elliptical, about 1.5 mm. long and 3 mm. wide: Leaves about 1.5–2 cm. wide; flowers 1–1.5 mm. apart; lip slightly retuse

3. *obanense*

Leaves 5–9 mm. wide; flowers 4–5 mm. apart; lip with a broad blunt projecting apex 4. *laxiflorum*

1. *R. longicalcar* *Summerhayes* in Kew Bull. 1936: ined. Flowers very pale green.

S. Nigeria: Kwa River, Obutong Beach! Exsicc.—*Talb.* 937; 939.

2. *R. rutilum* Schltr. l.c. 81. *Mystacidium rutilum* Dur. et Schinz—F.T.A. 7: 173. Flowers pale green or tinted orange.

French Guinea: Kouria (Aug.)! Sierra Leone: Njala (July)! Also Gabon, St. Thomas, Uganda. Exsicc.—*Pobéguin* 1678. *Deighton* 2784.

3. *R. obanense* *Summerhayes*, comb. nov. *Angraecum obanense* Rendle, Cat. Talb. Nig. Pl. 104.

S. Nigeria: Obani! Exsicc.—*Talb.* 896.

4. *R. laxiflorum* *Summerhayes* in Kew Bull. 1936: ined. Flowers greenish-white.

Ivory Coast: Mt. Goula, near Danané, 1,500 ft. (April)! Gold Coast: Aburi (March)! Exsicc.—*Chev.* 21213. *Johnson* 858.

36. RANGAERIS Summerhayes in Kew Bull. 1936: ined.

Lip 3-lobed, 8–9 mm. long, middle lobe lanceolate, obtusely acuminate, lateral lobes much shorter, almost orbicular, obscurely crenulate or dentate; stem very long and slender, leaves placed at intervals of 4–5 cm.; leaves narrowly oblong-lanceolate, acute, 6–7 cm. long, 1.2–1.6 cm. broad; inflorescence few-flowered, 4–12 cm. long; sepals and petals 7.5–8.5 mm. long; spur 3.5–4 cm. long 1. *trilobata*

Lip entire, sometimes slightly crenulate along the lower margins:

Spur 15 cm. long; stem elongated, about 0.5 cm. in diameter; leaves narrowly oblong, obscurely unequally bilobed at the apex, 9–12 cm. long, 1–1.5 cm. broad; inflorescences 8–15 cm. long, 3–4-flowered, bracts 10–12 mm. long; sepals and petals lanceolate, acuminate, 2–2.5 cm. long; lip like sepals; column semi-terete, about 6 mm. long; viscidium rectangular, 3 mm. long, stipites much broadened in the upper part 2. *longicaudata*

Spur less than 7 cm. long:

Bracts very broad and sheathing, 2.5–7 mm. long; leaves fleshy with almost parallel sides, 7–17 cm. long; viscidium single, rectangular or elliptical, longer than broad; rostellum 3-lobed, middle lobe much shorter than laterals; inflorescences as long as, or a little shorter than, the leaves; sepals 6–9 mm. long; lip lanceolate with a thickened callose apex:

Spur almost straight, 3.5–6.5 cm. long; leaves very shortly bilobed or retuse at the apex, the lobes rounded, 1–1.7 cm. broad 3. *muscicola*

Spur incurved at the apex, 7–13 mm. long; leaves Iris-like, acute and entire at the apex, 5–10 mm. broad 4. *rhypsalisocia*

Bracts narrow, lanceolate, 2–4 mm. long; leaves wider in the upper part, unequally bilobed at the apex; viscidia 1 or 2, orbicular or reniform, not longer than broad; middle lobe of rostellum longer than lateral lobes; spur about equalling the lip, straight; lip without callose apex:

Leaves lanceolate or broadly oblanceolate, 10–23 cm. long, 2–5 cm. broad; viscidium single, reniform; column without a foot, the lateral sepals arising from the apex of the ovary; sepals 6.5–8 mm. long; lip equalling the sepals, about 4–5 mm. broad 5. *Dorotheae*

Leaves oblanceolate-oblong, 9–14 cm. long, 1.3–1.8 cm. broad; viscidia 2, orbicular; column with a distinct foot, the lateral sepals arising on it between the apex of the ovary and the mouth of the spur; sepals 5.5–6.5 mm. long; lip equalling the sepals, 2–2.5 mm. broad 6. *biglandulosa*

1. *R. trilobata* *Summerhayes* in Kew Bull. 1936: ined.

S. Nigeria: Eket! Exsicc.—*Talb.* 3299.

2. *R. longicaudata* *Summerhayes*, comb. nov. *Mystacidium longicaudatum* Rolfe, F.T.A. 7: 170.

S. Nigeria: Lagos! Exsicc.—*Millen* 188.

3. *R. muscicola* Summerhayes, comb. nov. *Listrostachys muscicola* Rolfe, F.T.A. 7: 158. *Mystacidium Batesii* Rolfe. *Angraecum Batesii* Rendle, Cat. Talb. Nig. Pl. 146. Flowers white.
 French Guinea: Dalaba! Sierra Leone: Mapako to Mabonto (Aug.)! Gold Coast: Offin Valley (Oct.-Dec.)! S. Nigeria: Oban! Kumba (July)! Eastwards to Kenya, Tanganyika and south to Angola. Exsicc.—Caille 18128b. Deighton 1214. Irvine 649 (partly). Miles 9. Schlechter 15770. Talb. 897.
 4. *R. rhipsalisocia* Summerhayes, comb. nov. *Listrostachys rhipsalisocia* Rolfe, F.T.A. 7: 158. *L. colarum* Chev. Bot. 622. Flowers white.
 French Guinea: Sahadougou (March)! Sierra Leone: Makump (Feb.)! Gold Coast! S. Nigeria: Umu Alwa (Jan.)! Oban! between Ibadan and Abeokuta (March)! Also French Cameroons and Angola. Exsicc.—Chev. 20883. Pobéguin 1533. Deighton 1278. Smythe 112. Irvine 649 (partly). Carpenter 177. Talb. 1424. Schlechter 13031.
 5. *R. Dorotheae* Summerhayes, comb. nov. *Angraecum Dorotheae* Rendle, Cat. Talb. Nig. Pl. 107, t. 15, figs. 3-5. S. Nigeria: Oban! Exsicc.—Talb. 914; 915.
 6. *R. nigilandulosa* Summerhayes in Kew Bull. 1936: ined.
 French Guinea: Dalaba, Diaguissa, 3,300-4,300 ft. (Oct.)! Exsicc.—Chev. 18782.

37. PODANGIS Schltr. in Beih. Bot. Centralbl. 36, II: 82.

Stem up to 11 cm. long, usually much shorter, leafy at the apex; leaves 4-16 cm. long, 5-9 mm. broad; inflorescences (including flowers) up to 6 cm. long; sepals and petals more or less elliptical, obtuse, 3-5-5 mm. long; lip more or less orbicular, about 6 mm. long; spur 11-12 mm. long, wide at mouth, constricted in middle, swollen and often shortly lobed at the apex *dactyloceras*

- P. *dactyloceras* Schltr. l.c. *Listrostachys dactyloceras* Rehb. f.—F.T.A. 7: 168. *L. forcipata* Kraenzl. l.c. Flowers white.
 French Guinea: Kissi, Koundian (Feb.)! Futa Jallon, Dalaba (April)! Sierra Leone: Shengama, near Serabu (June)! Togo: Amedzofwe, 2,500 ft. (Feb.)! S. Nigeria: Bamenda, 5,000 ft. (Feb.)! Cameroons Mt.: Buea, 3,200-4,300 ft. (March)! Also French Cameroons and Angola. Exsicc.—Chev. 18128; 20742. Deighton 1955. Irvine 163. Mailland 699; 1415. Migeod 480. Preuss.

38. CALYPTROCHILUM Kraenzl. in Engl. Bot. Jahrb. 22: 30.

Inflorescence many-flowered, very dense, bracts closely imbricate, middle ones 4-7 mm. long; leaves 7-15 cm. long, 2.5-4.5 cm. wide; lip obscurely 3-lobed in front, side lobes broadly rounded, middle lobe much smaller, acute; sepals about 1 cm. long; lip including spur 2 cm. long 1. *emarginatum*
 Inflorescence usually 6-9-, sometimes up to 12-flowered, rather lax, bracts not imbricate, middle ones 2-4 mm. long; leaves 3.5-11 cm. long, 0.8-2.5 cm. wide; lip distinctly 3-lobed, lobes rounded, middle lobe much larger and longer than side lobes, emarginate; sepals 6-8 mm. long; lip including spur 1.8 cm. long 2. *Christyanum*

1. *C. emarginatum* Schltr. in Beih. Bot. Centralbl. 36, II: 84. *Angraecum imbricatum* Lindl.—F.T.A. 7: 144; Chev. Bot. 618. Flowers white, fragrant.
 French Guinea: Kissi, Korodou! Sierra Leone: Bumban, 650 ft.! Matotoka (July)! Makuta (June)! Taninahun (April)! Port Lokkoh (April)! Katumaho (May)! Liberia: Ganta! Ivory Coast: Mt. Gouila, 1,500 ft. (April)! Gold Coast: Offin Valley! Ahuren (June)! Kukurentumi (April)! Aburi (April)! S. Nigeria: Onitsha! between Victoria and Bimbia (April)! Ijebu, Baba Eko (April)! Also French Cameroons to Angola. Exsicc.—Chev. 20727; 21227. Thomas 473; 1800; 1971. Deighton 1728. Miles 12. Sc. Elliot 5734. Johnson 3; 759. Hoices 1172. Barter 1484. Preuss 1240. Ross 246.
 2. *C. Christyanum* Summerhayes, comb. nov. *Angraecum Christyanum* Rehb. f.—F.T.A. 7: 142. *A. Moloneyi* Rolfe, l.c. 145. *A. torense* Chev. Bot. 618. Flowers greenish-yellow.
 French Guinea: between N'Zo and Sakomanta (March)! Sigüiri, Tigioulé (May)! Koumi! Séré (July)! Liberia! Ivory Coast: Toura, Gourenl, 2,700 ft. (May)! Mt. Goula, 1,500 ft. (April)! Gold Coast: Kumasi (Jan.)! S. Nigeria: Lagos! Agolo! Degema! Also Congo, Uganda, Angola. Exsicc.—Chev. 21083; 21229; 21640; 25900. Pobéguin 1679. Vigne 3736. Thomas 234. Rowland. Talbot.

39. ANGRAECUM Bory—F.T.A. 7: 133, partly.

Leaves with sharp points, not closely imbricate at the base; pollinia attached directly to the broad viscidium, stipes absent:

Leaves subulate-terete, more or less falcate, 3-13 cm. long, 1-2.5 mm. in diameter; sepals about 4 mm. long; lip almost orbicular, spur 5 mm. long . . 1. *subulatum*

Leaves oblong-lanceolate, flattened, fleshy, 2-4 cm. long, 3-6 mm. wide; sepals 6-7 mm. long; lip much broader than long, spur 4.5 mm. long . . 2. *pungens*

Leaves without sharp points:

Flowers solitary on short peduncles; sepals 5 mm. long or less; leaves less than 2 cm. long, closely imbricate at the base, lying in the vertical plane of the stem:

Leaves falcately oblong-elliptical, obtuse, 5-15 mm. long, 3-8 mm. broad; sepals 2-3 mm. long; spur 5-6 mm. long 3. *distichum*

Leaves narrowly lanceolate-oblong, almost straight, subacute, 10-18 mm. long, 2-3 mm. broad; sepals 4.5-5 mm. long; spur 4.5-6 mm. long . . 4. *podochiloides*

Flowers either solitary on long peduncles or peduncles several-flowered; sepals 8 mm. or more long; leaves flat, more or less unequally bilobed at the apex, usually more than 4 cm. long:

Sepals over 3 cm. long; lip broad, nearly as long as the sepals, long-apiculate at the apex, spur broadly conical at the base, constricted in the middle, fusiform in the apical portion:

Sepals 3-5.5 cm. long (usually less than 4.5 cm.); lip almost orbicular, 2.5-3.5 cm. wide, side lobes rounded, not projecting forward beyond the base of the central apiculus; leaves 7-14 cm. long, 1.5-3.5 cm. broad 5. *birrimense*



FIG. 336.—*CALYPTROCHILUM EMARGINATUM* Schltr. (ORCHIDACEAE).

A, lip. B, column.

Sepals 3.5–6 cm. long (usually not less than 4.5 cm.); lip widest in the front, 4–6 cm. wide, side lobes projecting forward beyond the base of the central apiculus so that the lip is more or less cordate; leaves 7–10 cm. long, 1.5–4 cm. broad

6. *Eichlerianum*

Sepals 2 cm. or less long; lip usually with a central low keel in the basal part:

Lowest bract 1 cm. or more from base of inflorescence:

Lip narrowed just above the column, suddenly widened in the middle, running out at the apex into a long acumen, 13.5 mm. long; spur 2 cm. long, base wide, middle constricted, apical half moderately dilated; leaves very unequally and acutely bilobed, 3–7 cm. long, 6–12 mm. wide; inflorescence 2–4-flowered

7. *angustum*

Lip widest just above the column, lanceolate-ovate or ovate, 7.5 mm. long; spur much swollen at the apex, 7–11 mm. long; inflorescence 1–3-flowered:

Leaves ovate or lanceolate-ovate, 2.5–4 cm. long, 8–20 mm. wide; lip lanceolate-ovate, apiculate; spur 7 mm. long, apical quarter dilated into an almost globose sac

8. *Egertonii*

Leaves narrowly elliptical-oblong, 7–11 cm. long, 12–22 mm. wide; lip ovate, acute; spur 10–11 mm. long, apical one-third dilated into an ellipsoid sac

9. *pyriforme*

Lowest bract 8 mm. or less from base of inflorescence:

Leaves tapering gradually from just above the base, very unequally and acutely bilobed at the apex, the shorter lobe so small that the leaf appears to be simply acute, 4–9 cm. long, 8–23 mm. wide; petals, from a very short broad base, very long and narrow (0.6 mm. wide at 4 mm. above the base); lip ovate, shortly acuminate, 14–17 mm. long, without a central keel; spur with a wide base and swollen apex

10. *angustipetalum*

Leaves with more or less parallel sides, not very unequally nor acutely bilobed at the apex; petals lanceolate or oblong-lanceolate, over 1 mm. wide; lip with a central keel:

Leaves less than 1 cm. wide, sides parallel to the apices of the lobes, sinus between the 2 lobes acute, the shorter lobe, though rounded, with a quite distinct apex; sepals and petals lanceolate, acuminate, about 1 cm. long; lip elliptical with a long narrow acumen; spur scarcely thickened towards the apex, 16 mm. long

11. *Chevalieri*

Leaves 1–2 cm. wide, narrowed just at the apex so that the apical lobes are connivent, sinus between lobes very shallow or almost lacking, the shorter lobe thus having no free apex; sepals and petals subacute or apiculate, 8–10 mm. long; lip ovate, acute or shortly acuminate; spur distinctly thickened in the apical half, widest just beyond the middle and tapering from there to the almost acute apex, 11–14 mm. long

12. *multinominatum*

1. *A. subulatum* Lindl. in Hook. Comp. Bot. Mag. 2: 206; Cat. Talb. Nig. Pl. 147. *Listrostachys subulata* Rchb. f.—F.T.A. 7: 168.
Sierra Leone: Potolo (Dec.)! Ivory Coast: Bouroukrou (Dec.–Jan.)! S. Nigeria: R. Nun! Ijebu, Shasha Forest! Brass R.! Sacrifice I., Brass River! Sapoba! Oban! Fernando Po! Also French Cameroons and Congo. Exsicc.—*Sc. Elliot* 4334. *Chev.* 16524. *Barter* 52; 20125. *Kennedy* 1796. *Talb.* 902.
2. *A. pungens* Schltr. in Engl. Bot. Jahrb. 38: 163; Cat. Talb. Nig. Pl. 147.
S. Nigeria: Oban! Kriegschiffhafen, near Bimbia (Sept.)! Exsicc.—*Schlechter* 15774. *Talb.* 892.
3. *A. distichum* Lindl. Bot. Reg. t. 1781; Cat. Talb. Nig. Pl. 146. *Mystacidium distichum* Benth.—F.T.A. 7: 176. Flowers white.
Sierra Leone: Dillah Juleh, Taia River (June)! Nimini (July–Aug.)! Wübenforce! between Tawia and Herimankuna! Sugar Loaf Mt.! Kofoko, 800 ft. (Sept.)! Rowalla! Njala (Aug.)! Liberia: Begwai (Sept.)! Ivory Coast: between Danani and Goutokouma (April)! Yapo! S. Nigeria: Sapoba! Lagos! Ijebu, Shasha Forest (May)! Brass River! Nun River (Sept.)! Onitsha! Oban! Eket! Degema! Also French Cameroons, Gabon, St. Thomas, Princes I., Belgian Congo and Uganda. Exsicc.—*Dave* 5200. *Smeathman*. *Thomas* 1014; 2144. *Deighton* 1403. *Sc. Elliot* 4492. *Johnston* 100. *Chev.* 16841; 21300. *Kennedy* 1806. *Millen* 27. *Barter* 1362; 1854. *Munn* 523. *Talb.* 784; 3272. *Bunting* 59. *Richards* 3462.
4. *A. podochiloides* Schltr. in Engl. Bot. Jahrb. 38: 162; Cat. Talb. Nig. Pl. 146. *Monizus aporum* Finet.
Ivory Coast: Upper Cavalry River (June)! S. Nigeria: Oban! Bibundi (Oct.)! Exsicc.—*Pobéguin* 58. *Schlechter* 15769. *Talb.* 894.
5. *A. birrimense* Rolfe in Kew Bull. 1914, 214. *Mystacidium diabolicum* A. Chev. Bot. 623, name only.
Sierra Leone! Liberia: Du River (July–Aug.)! Mt. Nienokué, 1,670 ft. (July)! Gold Coast: Birrim! Aburi (Nov.)! S. Nigeria: Sapoba! Exsicc.—*Linder* 77; 212. *Chev.* 19465. *Miles*. *Johnson* 856. *Kennedy* 280.
6. *A. Eichlerianum* Kraenzl.—F.T.A. 7: 143; Cat. Talb. Nig. Pl. 146.
S. Nigeria: Calabar (Aug.)! Oban! Also French Cameroons, Belgian Congo, Portuguese Congo. Exsicc.—*Perez*. *Talb.* 899.
7. *A. angustum* Summerhayes, comb. nov. *Mystacidium angustum* Rolfe.—F.T.A. 7: 570. Flowers white, tinged brown or yellow.
S. Nigeria: Itu, Cross River (April)! Exsicc.—*Holland* 27.
8. *A. Egertonii* Rendle, Cat. Talb. Nig. Pl. 107.
S. Nigeria: Oban! Exsicc.—*Talb.* 889.
9. *A. pyriforme* Summerhayes in Kew Bull. 1936: ined. *A. multinominatum*, Cat. Talb. Nig. Pl. 147.
S. Nigeria: Oban! Ijebu, Shasha Forest (May)! Exsicc.—*Talb.* 888. *Richards* 3476.
10. *A. angustipetalum* Rendle, l.c. 106. Flowers white.
Gold Coast: Akim Hills (Dec.)! Akatin (Oct.)! S. Nigeria: Oban! Sapoba! Exsicc.—*Talb.* 890. *Kennedy* 1918. *Johnson* 595. *Vigne* 4039.
11. *A. Chevalieri* Summerhayes in Kew Bull. 1936: ined.
Ivory Coast: Between Sogui and Koualé (May)! Exsicc.—*Chev.* 21690.



FIG. 337.—*ANGRAECUM EICHLERIANUM* Kraenzl. (ORCHIDACEAE).

A, pollinia. B, column.

12. *A. multinominatum* Rendle, Cat. Talb. Nig. Pl. 107. *Mystacidium clavatum* Rolfe—F.T.A. 7: 172. Flowers pale yellow.
French Guinea: Kindia! Sierra Leone: Bafodeya (April)! Taninahun (April)! Togo: Quamikomu (March)! S. Nigeria: between Otta and Abeokuta! Onitsha! Exsicc.—Jacques 89. Sc. Elliot 5555. Deighton 1727. Schlechter 12952. Barter 477: 3352.

40. LISTROSTACHYS Rehb. f.—F.T.A. 7: 150, partly.

Stem usually less than 6 cm., rarely up to 15 cm. long; leaves 8–35 cm. long, 1–2 cm. broad, almost equally or slightly unequally bilobed at the apex, lobes obtuse; inflorescences 10–25 cm. long, peduncle 2–5 cm. long; sepals ovate, 2–3 mm. long; petals a little shorter and narrower; lip obovate or almost quadrate, shortly and broadly apiculate; spur clavate at the apex, 3–5 mm. long *pertusa*

- L. pertusa* Rehb. f.—F.T.A. 7: 161. *Angraecum pertusum* Lindl.—Cat. Talb. Nig. Pl. 147. Flowers white.
Sierra Leone: Njala (Nov.)! Liberia: Duport (Nov.)! Banga (Oct.)! Begwal (Oct.)! Peter's Town (Oct.)! Mt. Barclay (Nov.)! Ivory Coast: Mt. Nienokoué, 1,670 ft.! S. Nigeria: Lagos! Brass River! Nun River! Eket! Oban! Also French Cameroons. Exsicc.—Deighton 2552. Linder 1208; 1254; 1476. Chev. 19662. Barter 1826. Mann 524. Bunting 25; 26; 97. Talb. 916; 3382.

41. MICROCOELIA Lindl. Gen. and Sp. Orch. 60.

Rostellum much longer than the column, arising from near its apex and projecting forward like a bird's beak; stipes of pollinia very narrow, as long as rostellum, suddenly widened just below insertion of pollinia; viscidium linear, nearly as long as the rostellum, recurved back and parallel to the stipes; lip 3-lobed from the base, lateral lobes small, triangular, middle lobe broadly transversely elliptical from a narrow claw, retuse with a central apiculus, margins lacerate; spur incurved, not much swollen, 8 mm. long (straightened); sepals and petals about 4 mm. long; stem short; inflorescence 3–12 cm. long 1. *macrorrhynchium*

Rostellum not longer than the column, sometimes arising from near its base:

Limb of lip very small, 2–3.7 mm. long, much shorter than the straight spur:

Rostellum very short, arising from near the apex of the short thick column; viscidium reniform-oblong, about as long as broad; limb of lip 2 mm. long with 2 very obscure small lateral lobes at the base; spur about 2 cm. long, narrowed from the mouth to 5 mm. from apex, then suddenly swollen, tapering from there to the end; sepals and petals 2–3 mm. long 2. *microglossa*

Rostellum arising from near the base of the long slender column and projecting upwards, bilobed from the base; stipes long and slender, sharply bent in the middle so that the 2 halves are nearly parallel; viscidium oblong-lanceolate, nearly as long as the rostellum; limb of lip 2–3.7 mm. long, narrowed towards the base; spur 7–13 mm. long, narrowed just near the mouth, much swollen in the middle and again slightly at the apex; sepals and petals 2.5–4 mm. long

3. *caespitosa*

Limb of lip large, ovate, with a narrow claw, longer than the curved spur, 6.5 mm. long, 4.5 mm. broad; sepals and petals 4.5–5 mm. long; rostellum arising from the base of the column, curved forward and downwards, bifid from the base; stipes long, narrowed, bilobed in the upper part; viscidium linear, as long as the rostellum

4. *dahomeensis*

1. *M. macrorrhynchium* Summerhayes, comb. nov. *Angraecum macrorrhynchium* Schltr. in Engl. Bot. Jahrb. 38: 22. Flowers white.

Gold Coast: Pamu Berekum, 1,000 ft. (Sept.)! Also French Cameroons. Exsicc.—Vigne 2490.

2. *M. microglossa* Summerhayes in Kew Bull. 1936: ined.

S. Nigeria: Oban! Exsicc.—Talb.

3. *M. caespitosa* Summerhayes, comb. nov. *Angraecum caespitosum* Rolfe—F.T.A. 7: 150; Cat. Talb. Nig. Pl. 146. *A. Andersonii* Rolfe. Flowers white and green.

Liberia: Gbanga (Sept.)! Ivory Coast: between Zago and Gaouloubri (May)! Gold Coast: Tarquah (Sept.—Dec.)! S. Nigeria: Oban! Also French Cameroons and Belgian Congo. Exsicc.—Linder 603. Chev. 16340. Miles. Talb. 591.

4. *M. dahomeensis* Summerhayes, comb. nov. *Dicranotaenia dahomeensis* Finet in Bull. Soc. Bot. Fr. Mém. 9: 47, t. 9, figs. 23–28. Flowers white, fragrant.

Gold Coast: Assuantsi (Aug.)! Dahomey: Adja Ouéré. Exsicc.—Miles. Le Testu 125 (not seen).

42. DIAPHANANTHE Schltr. Die Orchid. 593.

Stipites of pollinia attached to a common viscidium:

Stem short, bearing the leaves in a relatively dense tuft:

Sepals 9–11 mm. long; leaves oblanceolate, curved, unequally bilobed or almost entire at the apex, 15–70 cm. long, 2.5–7 cm. wide; inflorescences many-flowered, pendulous, 15–55 cm. long; lip quadrate, 8–11 mm. long, margins shortly fimbriate; spur about as long as the lip 1. *pellucida*

Sepals 6 mm. long; leaves lanceolate, acute, 6–11 cm. long, 0.8–1.3 cm. wide; inflorescences arcuate, 7–15 cm. long; lip ovate, 4 mm. long, margins entire; spur much longer than the lip 2. *Bueae*

Stem elongated, bearing the leaves at more or less regular intervals; leaves oblong-lanceolate to narrowly ovate, very distinctly and acutely bilobed at the apex, 5–14 cm. long, 1.5–4.5 cm. wide; inflorescences 5–18 cm. long, many-flowered;



FIG. 338.—*DIAPHANANTHE BIDENS* Schltr. (ORCHIDACEAE).

A, flowering shoot. B, flower, with lip removed (front view). C, same (side view).
D, lip. E, column. F, pollinia. G, fruit.

sepals 3-5 mm. long; lip quadrate, 3-5 mm. long; spur a little longer than the lip 3. *bidens*
 Stipites each with a separate viscidium; stem short:
 Lip 3-lobed, lateral lobes longly pectinate, front lobe much smaller, tooth-like, entire;
 petals shortly pectinate; spur filiform, about 2 cm. long; sepals and petals 4-5
 mm. long; leaves linear-lanceolate, unequally and acutely bilobed at the apex,
 6-10 cm. long, 7-10 mm. wide; inflorescences 6-11 cm. long, 5-9-flowered

4. *polydactyla*

Lip entire, shortly apiculate at the apex, margins sometimes somewhat undulate;
 petals entire:

Spur not quite so long as the lip; lip obovate from a narrow base, margins undulate,
 1.7-1.8 cm. long, callus at mouth of spur tooth-like; sepals 1.5-1.8 cm. long;
 leaves oblanceolate-linear, 25-50 cm. long, 2-5 cm. wide; inflorescences 10-30 cm.
 long 5. *kamerunensis*

Spur more than 3 times as long as the lip; lip ovate with a broad base, 3 mm. long,
 callus at mouth of spur rim-like; sepals 4-4.5 mm. long; leaves oblanceolate,
 4-17 cm. long, 1-4.5 cm. wide; inflorescences 10-35 cm. long .. 6. *curvata*

1. *D. pellucida* Schltr. l.c. *Listrostachys pellucida* Rehb. f.—F.T.A. 7: 162. *Angraecum pellucidum* Lindl.—Cat. Talb. Nig. Pl. 147. Flowers white.
 French Guinea: Faranah (Feb.)! Sierra Leone: Njala (Nov.)! Kanya, 1,500 ft. (Oct.)! Lumbayara (Feb.)! Liberia: Moylakwelli to Totokwelli (Oct.)! between Rebbio and Peter's Town (Nov.)! Gold Coast: Pannu-Berekum, 1,000 ft. (Sept.)! Bou (Nov.)! Aburi! Obenemassi! Akwapim Hills, 1,500 ft. (Oct.)! Togo: Alavanyo, near Hohoe (Sept.)! S. Nigeria: Brass River! Onitsha! Old Calabar! Lagos! Oban! Barombi (Aug.)! Also French Cameroons and Congo. Exsicc.—Chev. 20655. Deighton 2554. Thomas 3013. Sc. Elliot 5005. Linder 1375. Johnston. Vigne 1586; 2489. Johnson 226; 857. Thompson 1439. Barter 37; 1757. Talb. 900. Preuss 445. Bunting 30.
2. *D. buaeae* Schltr. in Beih. Bot. Centralbl. 36, II: 96. Flowers white and green.
 Cameroons Mt.: Buea, 3,300 ft. (July-Aug.)! Exsicc.—Deistel.
3. *D. bidens* Schltr. l.c. 98. *Listrostachys bidens* Rolfe—F.T.A. 7: 160. *L. ashantensis* Rehb. f. *Angraecum bidens* Rendle, Cat. Talb. Nig. Pl. 147. Flowers salmon-pink or white.
 French Guinea: Kouria (Aug.)! between Lola and Nzo (March)! Faranah, Socourala! Sierra Leone: Moa River (July-Aug.)! Mayoso (Aug.)! Matotoka (July)! Mamaha! Yonibana! Wilberforce! Njala (Aug.)! Dilleh-Juleh (Aug.)! Liberia: Mt. Barclay (June-July)! Du River (July)! Ivory Coast: Guidé (May)! Gold Coast: Aburi (April)! Cape Coast Castle! S. Nigeria: Old Calabar (May)! Ila! Oban! Ijebu, Baba Eko (May)! Degema! Eket! Barombi! Victoria (May)! between Victoria and Binbia (May)! Also French Cameroons, Belgian Congo, Uganda. Exsicc.—Chev. 16439; 20504; 20991. Poëguin 1573. Dauce 533; 559. Thomas 1344; 1465; 1923; 4107; 4410. Johnston 101. Deighton 1210. Linder 79. Johnson 228. Holland 46. Vogel. Preuss 335; 1227. Maitland 725. Talb. 913; 3742. Hunting 12; 76; 161. Ross 283.
4. *D. polydactyla* Summerhayes, comb. nov. *Listrostachys polydactyla* Kraenzl. in Engl. Bot. Jahrb. 51: 394. *Crossogangis polydactyla* Schltr. Flowers greenish-white.
 S. Nigeria: Kufum, Bannso Mts., 5,800 ft. (Oct.)! Exsicc.—Ledermann 5716a.
5. *D. kamerunensis* Schltr. in Beih. Bot. Centralbl. 36, II: 96. Flowers greenish-white.
 S. Nigeria: Neu-Tegel (July)! Ediki (July)! Cameroons Mt.: Buea, 3,300 ft. (July-Aug.)! Exsicc.—Deistel. Schlechter 15768. Winkler 209 (not seen).
6. *D. curvata* Summerhayes, comb. nov. *Mystacidium curvatum* Rolfe—F.T.A. 7: 174. *Angraecum minutum* Chev. Bot. 618. *A. curvatum* Schltr.—Cat. Talb. Nig. Pl. 146. Flowers yellowish-green.
 Ivory Coast: between lower Sassandra and Cavally Rivers (June-July)! Gold Coast: Ashanti! Aburi! Offin Head Waters, 1,500 ft. (Nov.)! S. Nigeria: Oban! Exsicc.—Chev. 19248. Johnson 285. Vigne 3415. Talb. 938.

43. SARCORHYNCHUS Schltr. in Beih. Bot. Centralbl. 36, II: 104.

Stem up to 12 cm. long; leaves linear-oblong, unequally and connivently bilobed at the apex, 3-8 cm. long, 7-13 mm. wide; inflorescences 4-22 cm. long, many-flowered; sepals 2.5-4 mm. long; lip 2.7-3.6 mm. long; spur shorter than the lip, swollen in the apical part *polyanthus*

8. *polyanthus* Schltr. l.c. 105. Flowers greenish-white.
 S. Nigeria: Kumbo, Bannso Mts., 6,700 ft. (Oct.)! Exsicc.—Ledermann 5741; 5763.

44. BOLUSIELLA Schltr. in Beih. Bot. Centralbl. 36, II: 105.

Inflorescence very dense, 2-4.5 cm. long; bracts 3-4 mm. long, closely imbricate, nearly as long as the flowers; leaves up to 3 cm. long, obtuse or rarely subacute; spur shorter than the lip; sepals 3 mm. long; lip 2 mm. long .. 1. *imbricata*
 Inflorescence lax, 2-8 cm. long; bracts 1-2.5 mm. long, not imbricate, only about half as long as the flowers; leaves up to 8 cm. long, subacute or acute; spur longer than the lip; sepals 1.7-2.8 mm. long; lip 1.7-2 mm. long .. 2. *Talbotii*

1. *B. imbricata* Schltr. l.c. 106. *Listrostachys imbricata* Rolfe. Flowers white.
 Gold Coast: Ashanti, Akumudadan, 1,000 ft. (Aug.)! Also Kenya Colony. Exsicc.—Vigne 2436.
2. *B. talbotii* Summerhayes, comb. nov. *Angraecum talbotii* Rendle, Cat. Talb. Nig. Pl. 108. Flowers white.
 Sierra Leone: Makan (Aug.)! Makump (Aug.)! Sugar Loaf Mt.! Liberia! Gold Coast: Aburi (July)! S. Nigeria: Oban! Exsicc.—Talb. 941. Thomas 1633. Deighton 1438. Barter. Linder 65. Johnson 4.

45. CHAMAEANGIS Schltr. in Beih. Bot. Centralbl. 36, II: 107.

Flowers 1 at each node of the inflorescence; sepals 5-6 mm. long; lip shortly trilobed at the apex, about 6 mm. long; spur 13-18 mm. long, swollen part ellipsoid-fusiform, 6-9 mm. long; leaves 17-38 cm. long, 2.5-4.5 cm. broad; inflorescences 20-50 cm. long 1. *ichneumonea*

Flowers in opposite pairs; sepals 1.5–3 mm. long; lip lanceolate, entire, 1.5–3 mm. long; spur 4.5–10 mm. long, swollen part ellipsoid or almost globular, 1.5–3.5 mm. long; leaves 8–30 cm. long, 0.8–2 cm. broad; inflorescences 8–35 cm. long

2. *vesicata*

1. *C. ichneumonea* Schltr. l.c. 108. *Listrostachys ichneumonea* Rehb. f.—F.T.A. 7: 163. Flowers white or cream.

Sierra Leone: Juring (Dec.)! Liberia: Mt. Barclay (July)! Plazon (June)! S. Nigeria: Nun River (Sept.)! Degema! Eket! Exsicc.—Deighton 318. *Bunting* 15; 157. *Mann* 520. *Talb.* 3259.

2. *C. vesicata* Schltr. l.c. 109. *Listrostachys vesicata* Rehb. f.—F.T.A. 7: 163. Flowers yellow-green.

French Guinea: Socourals (Jan.-frt.)! Sierra Leone: Northern Province (Sept.)! Bonable (Aug.)! Ivory Coast: Bouroukrou! Gold Coast: Assuantsi! Offin Valley (Oct.-Dec.)! Togo: Kadjapke, Hohoe, 1,700 ft. (Oct.)! S. Nigeria: Assaba! Eket! Also French Cameroons, Uganda and Kenya. Exsicc.—Chev. 18907b; 20505. *Deighton* 2242. *Dawe* 560. *Fishlock* 29. *Miles*. *Barter* 1839. *Talb.* 3758.

46. LEPTOCENTRUM Schltr. Die Orchid. 600.

Stem rather short; leaves closely imbricate at the base, oblong or elliptical-oblong, almost equally bilobed at the apex with rounded lobes, 12–30 cm. long, 2–3.5 cm. broad; inflorescence 25–60 cm. long, 4–10-flowered; sepals and petals lanceolate-linear, acuminate, the former 3.5–5 cm. long; lip about as long as the sepals, 1–2.5 cm. broad in the middle; spur 20–25 cm. long, spirally twisted *caudatum*

1. *caudatum* Schltr. in Beh. Bot. Centrabl. 36, II: 112. *Listrostachys caudata* Rehb. f.—F.T.A. 7: 153; Stapf 654. *Angraecum caudatum* Lindl.—Cat. *Talb.* Nig. Pl. 147. Flowers with green tepals and white lip.

Sierra Leone: Mabum (Aug.)! Lumbo (Oct.)! between Membo and Mambolo (Aug.)! Liberia: Grand Bassa. S. Nigeria: Brass River! Oban! Exsicc.—Whitfield. *Thomas* 1523. *Bunting* 67; 85. *Barter* 1858. *Talb.* 898.

47. AERANGIS Rehb. f. in Flora, 1865, 190.

Spur 13–22 cm. long, spirally twisted; leaves broadly oblanceolate, unequally bilobed at the apex, 8–23 cm. long, 1.5–6 cm. broad; inflorescences 15–60 cm. long, up to 15-flowered; sepals and petals 2–3 cm. long; lip about the same length, much wider than the sepals in the middle 1. *Kotschyana*

Spur less than 7 cm. long, not much twisted:

Distance between bracts subtending flowers less than 2.5 cm.; spur 3–4.5 cm. long; sinus between apical lobes of leaf acute or obtuse, shorter lobe with a distinct free end; leaves oblanceolate, 6–16 cm. long, 1.5–4 cm. broad; inflorescences 9–28 cm. long, 5–15-flowered; sepals 1–2.5 cm. long; lip very similar to the sepals, usually a little broader 2. *biloba*

Distance between bracts subtending flowers more than 2.5 cm.; spur 5.5–7 cm. long; leaves obliquely acute or obscurely bilobed at the apex, sinus scarcely distinguishable; sepals lanceolate, acuminate; lip almost indistinguishable from the sepals: Inflorescence 10–21 cm. long, 2–5-flowered, rachis almost straight, relatively stout, bracts 7–9 mm. long; sepals 2–3 cm. long; leaves 5–15 cm. long, 1–2.5 cm. wide, no sinus at apex 3. *Gravenreuthii*

Inflorescence 30–50 cm. long, 8–15-flowered, rachis zigzag in upper part, very slender, bracts 3–5 mm. long; sepals 2 cm. long or less; leaves about 9 cm. long, 2.5 cm. broad, sinus at apex very shallow 4. *arachnopus*

1. *A. Kotschyana* Schltr. in Beh. Bot. Centrabl. 36, II: 118. *Angraecum Kotschyunum* Rehb. f.—F.T.A. 7: 137. Flowers white, often tinged pink.

N. Nigeria: Neill's Valley, Naragau (June)! Bauchi Plateau (July)! Anglo-Jos and Mongu (June)! Mada Hills, 2,000–3,000 ft.! Also Sudan, Uganda, Tanganyika, Nyasaland and Portuguese East Africa. Exsicc.—Lely 272; P 381. *Hepburn* 82.

2. *A. biloba* Schltr. l.c. 114. *Angraecum bilobum* Lindl.—F.T.A. 7: 138. Flowers white.

French Guinea: Mamou (Aug.)! Sierra Leone: Kennema! Bumban to Lokko! Ivory Coast: Mt. Goula, 1,480 ft.! Dyola country (May)! Gold Coast: Odumassi! Togo! S. Nigeria: Lagos! Exsicc.—Pobéguin. *Milne* 557. *Sc. Elliot* 5740. *Chev.* 21221. *Ripert* 21538. *Johnson* 225. *Baumann* 592.

3. *A. Gravenreuthii* Schltr. l.c. 117. *Mystacidium Gravenreuthii* Rolfe—F.T.A. 7: 171. *Angraecum Stella* Schltr. Flowers white, spur reddish.

S. Nigeria: Neu-Tegel (July). Cameroons Mt., 6,000 ft. (June)! West of Buea, 6,300 ft. (May)! Exsicc.—Preuss 891. *Deistel*. *Schlechter* 15704 (not seen).

4. *A. arachnopus* Schltr. l.c. 113. *Angraecum arachnopus* Rehb. f.—F.T.A. 7: 140. Gold Coast! Exsicc.—cult. specimens.

48. BAROMBIA Schltr. Die Orchid. 600.

Stem short; leaves oblanceolate, unequally bilobed at the apex, 13–18 cm. long, 3.5–5.5 cm. broad; inflorescence 50 cm. long, 3-flowered; sepals and petals very narrow, 5–5.5 cm. long; spur very slender, swollen at the end *gracillima*

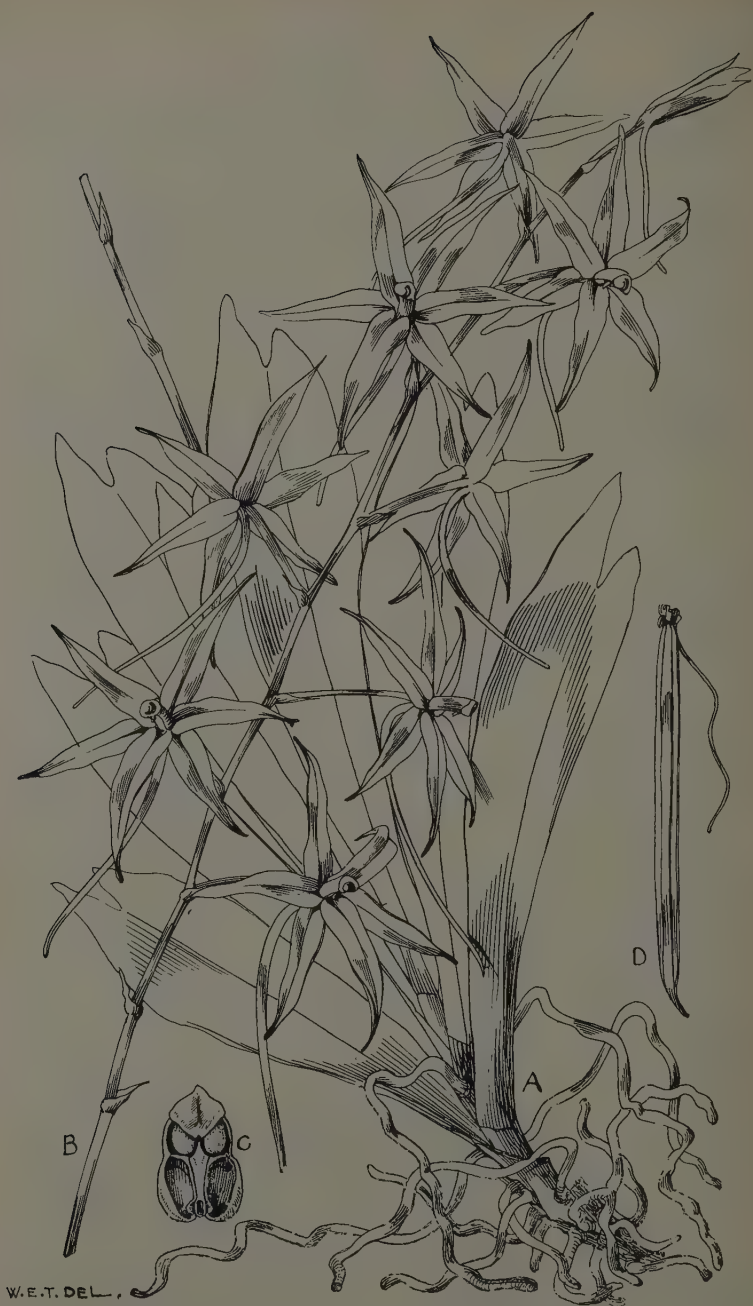
1. *gracillima* Schltr. in Beh. Bot. Centrabl. 36, II: 124. Flowers pale green, ends of tepals reddish, spur pale brown.

S. Nigeria: Barombi (Sept.)! Exsicc.—Preuss 459.

49. CYRTORCHIS Schltr. Die Orchid. 595.

Viscidium linear, gradually tapering from apex to base, equal in texture throughout its length; sepals 1–2.5 cm. long; spur 2.5–4.5 cm. long:

Leaves with nearly parallel sides, rigid and stiff in texture, cross veins not visible,



W.E.T. DEL.

FIG. 339.—*AERANGIS BILOBA* Schltr. (ORCHIDACEAE).
A, stem and leaves. B, inflorescence. C, column. D, fruit.



FIG. 340.—*CYRTORCHIS CHAILLUANA* Schltr. (ORCHIDACEAE).

A, flowering shoot. B, column and rostellum (side view). C, same (front view). D, anther. E, pollinia. F, viscidium (from above). G, same (from below). (In figs. E, F and G the hyaline lower part of the viscidium has been inadvertently omitted).

almost equally bilobed at the apex with semi-orbicular lobes, 8–20 cm. long, 1·3–3 (usually less than 2·5) cm. broad; inflorescence up to 16 cm. long, flowers closely placed

1. *bistorta*

Leaves oblong-elliptical or oblanceolate, tapering distinctly at both ends, not very rigid or stiff, the cross veins usually visible, especially in dried specimens, unequally bilobed at the apex with more or less connivent lobes, 5–20 cm. long, 1·7–5·5 cm. broad; inflorescence up to 30 cm. long, middle flowers at intervals of 1–2 cm.

2. *Monteiras*

Viscidium composed of a broad rather stiff upper portion with recurved edges and a linear, hyaline and very thin lower portion:

Spur 9 cm. long or more; sepals 3–5 cm. long; leaves oblong-oblanceolate, unequally bilobed at the apex with connivent rounded lobes, 8–25 cm. long, 1·7–3·5 cm. broad; inflorescences up to 22 cm. long, bracts broad and sheathing, 1–2 cm. long

3. *Chailluana*

Spur 6 cm. long or less:

Leaves long and narrow, with almost parallel sides, almost equally bilobed at the apex, 12–21 cm. long, 0·7–1·5 cm. broad; spur 2·5–4 cm. long; sepals 1·2–2 cm. long; upper part of viscidium suddenly narrowed to junction with lower part

4. *Aschersonii*

FIG. 341.—*SOLENANGIS SCANDENS* Schltr. (ORCHIDACEAE).

A, lip and column (side view). B, anther (from above), and C (from below). D, column. E, pollinia.

Leaves relatively broad, nearly always more than 1·5 cm. broad, unequally bilobed at the apex; upper part of viscidium gradually narrowed to junction with lower part; inflorescences 5–17 cm. long, bracts 1–1·7 cm. long:

Spur with a thickened hooked apex, 4–5 cm. long; sepals 3–4 cm. long; leaves 15–18 cm. long, 3–4 cm. broad 5. *hamata*

Spur with a tapering straight or hooked apex, 3·5–6 cm. long; sepals 1·5–3 cm. long; leaves 8–24 cm. long, 1·5–4 cm. broad 6. *Sedeni*

1. *C. historia* Schltr. in Beih. Bot. Centralbl. 36, II: 129. *Listrostachys bistorta* Rolfe—F.T.A. 7: 155. *L. Hookeri* Rolfe, l.c. 154. Flowers white. Sierra Leone! Gold Coast! S. Nigeria: Lagos! Cameroons Mt., 4,000–6,000 ft. (Nov.)! Exsicc.—*cul. specimena*. Mann 2114. Johnston 101.
2. *C. monteiras* Schltr. l.c. 132. *Listrostachys monteiras* Rehb. f.—F.T.A. 7: 156. *L. ignoti* Kraenzl. *Angraecum Aschersonii* Rendle, Cat. Talb. Nig. Pl. 147, not of Kraenzl. Flowers white or cream. Liberia: Totokwelli, Medina (Oct.)! Begwai (Oct.)! Gold Coast: Ankobra Valley (Nov.–Dec.) S. Nigeria: Lagos! Sapoba! Oban! Degema! Eket! Calabar! Barombi! Cameroons Mt.: Musaka Camp, 6,000 ft. (May)! Buea (Sept.)! French Cameroons, Belgian Congo, Angola, Uganda. Exsicc.—*Linder* 1295. *Bunting* 23. Miles 18. *Moloney*. *Kennedy* 1909; 1911. *Talb.* 936; 3379. *Williams* 52. *Preuss* 418. *Maitland* 735. *Deistel*.
3. *C. chailluana* Schltr. l.c. 130. *Listrostachys chailluana* Rehb. f.—F.T.A. 7: 153. *Angraecum chailluanum* Hook. f.—Cat. Talb. Nig. Pl. 147. Flowers white. S. Nigeria: Nun River (Sept.)! Calabar (Aug.)! Oban! Igbesa! Sapoba! Cameroons Mt.: Buea! Also French Cameroons, Gabon, Portuguese Congo, Uganda. Exsicc.—Mann 521. *Talb.* 119; 135; 901. *Preuss* 372. *Millen* 193. *Kennedy* 1913.
4. *C. aschersonii* Schltr. l.c. 129. *Listrostachys aschersonii* Dur. et Schinz—F.T.A. 7: 156.

- Gold Coast! S. Nigeria: Sapoba! Ijebu, Shasha Forest (May)! Also French Cameroons. Exsicc.—Kennedy 234. Ross 287.
5. *C. hamata* Schltr. l.c. 130. *Listrostachys hamata* Rolfe. Flowers white with green spur. S. Nigeria: Lagos! Exsicc.—cult. specimens.
6. *C. Sedeni* Schltr. l.c. 132. *Listrostachys Sedeni* Rehb. f.—F.T.A. 7: 154. *L. maiilis* Chev. Bot. 623. Flowers white.
- French Guinea: Douné (June)! Ivory Coast: between Zagoné and Soucoudra (May)! between Disandougou and Niangouépleu (May)! Mt. Dourou, 2,300 ft. (May)! between Gouékouma and Sogui (May)! Gold Coast: Gura (July)! Aburi (June)! Togo: Wlawia, Hohoe, 750–1,500 ft. (Oct.)! Dahomey: Atacora Mts., 1,200–2,000 ft. (June)! N. Nigeria: Bauchi Plateau! Abinsi (June)! Vom, 3,000–4,500 ft. Neill's Valley, Naraguta (June)! S. Nigeria: Okwoga to Uda (July)! Uganda, Kenya, Tanganyika. Exsicc.—Pobéguin 1636. Chev. 21527; 21580; 21683; 21741; 24215. Vigne 1257. Johnson 227. Thompson 1559. Dalz. 838. Dent Young. Lely 264. Kitson.

50. SOLENANGIS Schltr. in Beih. Bot. Centralbl. 36, II: 133.

- Sepals and petals 5–7 mm. long; lip entire, spur 2–2.5 cm. long; inflorescences 2–6 cm. long, bracts 1–2.5 mm. long; leaves elliptical-lanceolate, 3–7.5 cm. long, 0.8–2.3 cm. wide .. 1. *scandens*
- Sepals and petals 1.5–2 mm. long; lip 3-lobed, all lobes very short and broad, spur 5–7 mm. long; inflorescences 5–15 mm. long, bracts less than 1 mm. long; leaves broadly lanceolate or ovate-elliptical, 2–4 (rarely to 5.5) cm. long, 1–1.5 cm. wide .. 2. *clavata*

1. *S. scandens* Schltr. l.c. 134. *Angraecum scandens* Schltr.—Cat. Talb. Nig. Pl. 146. Flowers white or pale greenish-yellow.
- Sierra Leone: Yonibana (Oct.)! Gold Coast: Amentia (April)! Oda (Oct.)! Offin Valley (Oct.–Dec.)! Pramkese to Bansa (March)! Tiasi (Oct.)! S. Nigeria: Sapoba! Oban! Also French Cameroons to Belgian Congo. Exsicc.—Thomas 4112. Vigne 1389; 2906. Fishlock 58. Miles 14. Kitson 1255. Kennedy 1912. Talb. 893.
2. *S. clavata* Schltr. l.c. *Angraecum clavatum* Rolfe—F.T.A. 7: 145. Flowers cream-coloured or white, tinged green.
- Sierra Leone: Gbinti (July)! Kambia! Liberia: Begwai (Oct.)! Ivory Coast: Bouroukrou! Gold Coast: Oda (Oct.)! Offin Valley (Oct.–Dec.)! S. Nigeria: Lagos! French and Belgian Congo. Exsicc.—Deighton 2507. Sc. Elliot 4223. Chev. 16525. Fishlock 56. Miles 15. Moloney. Bunting 14.

51. DINKLAGEELLA Mansf. in Fedde, Repert. 36: 63.

- Stem up to 45 cm. long, slender; leaves spreading or reflexed, narrowly elliptical, unequally bilobed at the apex, 1.7–3 cm. long, 0.8–1.2 cm. wide; inflorescences 5–7 cm. long, about 5–6-flowered; sepals and petals elliptical, obtuse, 7–8.5 mm. long; lip 16–17 mm. long, lobes almost equal, oblong, obtuse, spur somewhat curved, with a wide mouth and slightly dilated towards the apex, 3 cm. long .. *liberica*

- D. *liberica* Mansf. l.c. 64. Flowers white, fragrant.

Liberia: Sinoe River (Nov.)! S. Nigeria: Sapoba! Exsicc.—Dinklage 2321. Kennedy 1900.

52. EURYCHONE Schltr. in Beih. Bot. Centralbl. 36, II: 134.

- Stem up to 7 cm. long; leaves broadly oblanceolate, unequally and subacutely bilobed at the apex, 7–14 cm. long, 2–5.5 cm. wide; inflorescences up to 6 cm. long, up to 5-flowered; sepals and petals 2–2.5 cm. long; lip about equalling the sepals, just over 2 cm. wide .. *Rothschildiana*

- E. *Rothschildiana* Schltr. l.c. 135. *Angraecum Rothschildianum* O'Brien. Flowers white with dark blotch in throat.

Sierra Leone: Mandu (July)! Ivory Coast: between Guidéko and Zozoro (June)! Also Uganda. Exsicc.—Deighton 2221. Chev. 19053.

53. CEPHALANGRAECUM Schltr. in Beih. Bot. Centralbl. 36, II: 135.

- Spur distinctly longer than the lip:

- Sepals 3.5–7 mm. long; spur over 5 mm. long; leaves mostly over 15 cm. long, 8–20 mm. wide:

- Margins of leaves with a few sharp teeth on each side below the apex, lobes at apex also usually with a small sharp point, leaves 17–28 cm. long, 1.5–2 cm. wide; sepals 3.5–5 mm. long; lip about as long as broad, 4.5 mm. long, 3.5–5 mm. broad; spur 7–8 mm. long .. 1. *capitatum*

- Margins of leaves entire near apex, lobes at apex sometimes emarginate or shortly bilobulate, never with sharp points, leaves 10–21 cm. long, 8–15 mm. wide; sepals 4.5–7 mm. long; lip as broad as long or broader, indistinctly 3-lobed with rounded lobes, 4–6 mm. long, 4–7.5 mm. broad; spur 6–9.5 mm. long .. 2. *glomeratum*

- Sepals 1.5–2.5 mm. long; spur 1.5–3 mm. long; leaves 5–13 cm. long, 3–8 mm. wide, rather unequally bilobed at the apex, lobes sometimes divergent; lip 3-lobed at the base, 1.7–1.8 mm. long .. 3. *Straussii*

- Spur shorter than the lip, 2–5 mm. long; sepals 3.5 mm. long; lip entire, 4–4.5 mm. long, 3–4.5 mm. wide; leaves unequally bilobed at the apex, lobes entire or emarginate, 6–13 cm. long, 7–13 mm. wide .. 4. *Braunii*

1. *C. capitatum* Schltr. l.c. 136. *Listrostachys capitata* Rehb. f.—F.T.A. 7: 166. Flowers pale rose-coloured. Liberia: Firestone Plantation No. 3! S. Nigeria: Brass River! Exsicc.—Linder 64. Barter 1857.

2. *C. glomeratum* Schltr. l.c. *Listrostachys glomerata* Rolfe, F.T.A. 7: 166. Flowers white.
- French Guinea: Faranah! Sierra Leone! Liberia: Mt. Barclay (June)! S. Nigeria: River Nun! Exsicc.—Chev. 20469. Lendy. Bunting 7. Barter 20106.

3. *C. Straussii* Summerhayes, comb. nov. *Angraecum Straussii* Schltr. in Engl. Bot. Jahrb. 38: 164; Cat. Tab. Nig. Pl. 146. *Ancistrorrhynchus Straussii* Schltr. Flowers white.
S. Nigeria: Oban! Moliwe (Aug.)! Exsicc.—Schlechter 15771. Tab. 940.
4. *C. Braunii* Summerhayes, comb. nov. *Listrostachys Braunii* Dur. & Schinz—F.T.A. 7: 167. *Listrostachys Metteniae* Kraenzl.
Cameroons Mt., 5,000 ft. ! Also St. Thomas. Exsicc.—Braun 19. Mann 2123.

54. ANCISTORRHYNCHUS Finet in Bull. Soc. Bot. Fr. Mém. 9: 44.

Stem up to 10 cm. long; leaves closely imbricate at the base, linear or linear-ligulate, very unequally and acutely bilobed at the apex, 15–70 cm. long, 4–16 mm. wide, longer lobe very acute, up to 5.5 cm. long, shorter lobe very small; inflorescence up to 3.5 cm. long, bracts much shorter than the flowers; sepals 2.5–4 mm. long; petals equal, much narrower; lip 3-lobed at the middle, 5–6 mm. long, front lobe very concave, undulate at the margins, side lobes rounded; spur twisted into an S-shape, swollen at the apex, 3.5–5 mm. long *clandestinus*

- A. *clandestinus* Schltr. in Beih. Bot. Centralbl. 36, II: 138. *Listrostachys clandestina* Rolfe, F.T.A. 7: 161. *Angraecum brunneo-maculatum* Rendle, Cat. Tab. Nig. Pl. 105, t. 14, figs. 6–9. *Ancistrorrhynchus stenophyllus* Schltr. *A. recurvus* Finet.
French Guinea: between Timbo and Conakry. Sierra Leone: Kuntaia (June)! Kamatu, 1,450 ft. (May)! Gold Coast: Assin to Yan Kumassi! S. Nigeria: Onitsha! Eket! Degemal! Oban, Ekong-Ndingane Road (May)! Cameroons Mt.: Buea, 3,000 ft. ! Exsicc.—Thomas 430; 491. Cummins 87. Barter 444. Tab. 943; 3744. Schlechter 12843.

55. ANGRAECOPSIS Kraenzl. in Engl. Bot. Jahrb. 28: 171.

Spur shorter than the lip, 2 mm. long, much swollen at the end; lateral sepals 3.5–4 mm. long; petals longer than broad, 2.7 mm. long, 1.5 mm. wide; leaves linear, 2–8 cm. long, 2–6 mm. wide, somewhat curved, shortly and acutely bilobed at the apex; inflorescences 4–7 cm. long 1. *tridens*
Spur much longer than the lip, 13 mm. long, only slightly swollen in the apical part; lateral sepals 5 mm. long; petals shorter than broad, 1.7 mm. long, 2.3 mm. wide; leaves elliptical-ligulate, 2–4 cm. long, 4–9 mm. wide, lobes at apex rounded; inflorescences 3–9 cm. long 2. *ischnopus*

1. A. *tridens* Schltr. in Beih. Bot. Centralbl. 36, II: 141. *Mystacidium tridens* Rolfe, F.T.A. 7: 174. *Angraecum occidentale* Rolfe, l.c. 142. Flowers greenish.
Cameroons Mt., Buea, 4,100 ft. (Sept.)! Fernando Po, 4,000 ft. (Dec.)! Exsicc.—Mann 646. Preuss 965.
2. A. *ischnopus* Schltr. l.c. 140.
Cameroons Mt.: Buea (May)! Exsicc.—Deistel.

56. TRIDACTYLE Schltr. Die Orchid. 601.

Spur a little shorter than or equalling the lip, a little swollen towards the apex; inflorescences less than 5 mm. long:

Leaves closely imbricate at the base, broadly and obtusely bilobed at the apex, 1–3 cm. long, 2–6 mm. wide; sepals 2.5–3 mm. long, obtuse; lip entire, ovate or elliptical, rounded at the apex, as long as the sepals 1. *Schumannii*

Leaves at about 1 cm. intervals, lanceolate-linear or elliptical-lanceolate, very unequally and narrowly bilobed at the apex, 4–7.5 cm. long, 4–9 mm. wide; sepals 3–4.5 mm. long, the laterals apiculate; lip with a small tooth on each side about the middle, apex narrow, acute, 5.5–6 mm. long 2. *lagosensis*

Spur at least twice as long as the lip:

Side lobes of lip much diverging, longer than the middle lobe; inflorescences up to 8 cm. long, many-flowered; leaves ligulate or lanceolate-ligulate, unequally bilobed at the apex, 5–20 cm. long, 1–2 cm. wide:

Spur very slender, scarcely thickened in the apical part, 7–11 mm. long; sepals 3.5–5 mm. long; lip 3.5–6 mm. long, 5.5–8 mm. wide across the side lobes

3. *tridactylites*

Spur distinctly swollen in the apical two-thirds, 7–8.5 mm. long; sepals 2.5–4.5 mm. long; lip 3.5–4.5 mm. long, 4–5.5 mm. wide across the side lobes 4. *armeniaca*

Side lobes of lip reduced to teeth, much shorter than the middle lobe, or absent:

Spur about 3 cm. long, slightly thickened towards the apex; leaves linear-oblong, broadly and obtusely bilobed at the apex, 5–6.5 cm. long, 7–9 mm. wide; sepals 7–7.5 mm. long; lip 6.5 mm. long, with a broad base, 2 teeth-like side lobes below the middle and a long narrow acute middle lobe 5. *muriculata*

Spur 11 mm. long or less; sepals less than 5.5 mm. long:

Inflorescences less than 5 mm. long; leaves oblong or elliptical-oblong, broadly and obtusely bilobed at the apex, 2–8 cm. long, 7–20 mm. wide; ovary, sepals and spur with numerous flat scales; sepals 3.5–5.5 mm. long; lip as long as the sepals, narrowly ovate, side lobes sometimes absent, 2 thickened auricles at the base; spur about 1 cm. long 6. *lepidota*

Inflorescences up to 4 cm. long; leaves linear-ligulate, unequally bilobed at the apex, up to 11 cm. long and 9 mm. wide; flowers not lepidote; sepals 2–2.5 mm. long; lip equalling sepals, ovate with a short tooth on each side below the middle; spur 5–6 mm. long 7. *fusifera*

1. *T. Schumanni* Summerhayes, comb. nov. *Mystacidium Schumanni* Rolfe, F.T.A. 7: 173. *Angraecum Schumanni* Kraenzl.—Cat. Talb. Nig. Pl. 146. *Phormangis Schumanni* Schltr. S. Nigeria: Oban! ? near Victoria! Exsicc.—Braun 20. Talb. 895.
2. *T. lagosensis* Schltr. in Beih. Bot. Centralbl. 36, II: 145. *Angraecum lagosense* Rolfe, F.T.A. 7: 145. S. Nigeria: Lagos! R. Niger! Exsicc.—Moloney. Barter.
3. *T. tridactylites* Schltr. l.c. 148. *Angraecum tridactylites* Rolfe—F.T.A. 7: 147. Flowers orange. Sierra Leone! Ivory Coast: Mt. Dou, 4,500 ft. (Jan.)! N. Nigeria: Bauchi Plateau! S. Nigeria: Interior of Lagos! Mfongu, near Bamenda, 5,700–6,300 ft. (Nov.)! Cameroons Mt., Buea, 2,700–5,300 ft.! Also Princes Island, Angola, Nyasaland, Portuguese East Africa. Exsicc.—Portères 552. Rowland. Schlechter 12340. Ledermann 5950. Deistel 593.
4. *T. armeniaca* Schltr. l.c. 143. *Angraecum armeniacum* Lindl.—F.T.A. 7: 147. *A. Whitfieldii* Rendle. Flowers orange. French Guinea: Socourala! Mt. Nzo (March)! Sierra Leone! Exsicc.—Chev. 20512. Fleury 21033. Whitfield.
5. *T. muriculata* Schltr. l.c. 146. *Angraecum muriculatum* Rendle, Cat. Talb. Nig. Pl. 105, t. 14, figs. 3–5. S. Nigeria: Oban! Exsicc.—Talb. 904.
6. *T. lepidota* Schltr. l.c. *Angraecum lepidotum* Rehb. f.—F.T.A. 7: 146. Flowers green, yellow-green or white. Sierra Leone: Njala (Nov.)! Liberia! S. Nigeria: Bonny (June)! Jameson River, Sapoba (Nov.)! Oban! Lagos! Old Calabar (Nov.)! French Cameroons and Congo, Belgian Congo, Uganda. Exsicc.—Deighton 2566. Monteiro. Ross 228. Talbot. Moloney.
7. *T. fusifera* Mansf. in Fedde, Repert. 36: 63. Flowers yellow. Liberia: Sinoe River (Dec.). Also Cameroons. Exsicc.—Dinklage (not seen).

182. JUNCACEAE

Perennial or annual herbs. Leaves mostly in a basal tuft, grass-like, linear or filiform, sheathing at the base or reduced to a sheath, sheaths open or closed.



FIG. 342.—*JUNCUS CAPITATUS* Weig. (JUNCACEAE).
A, flower. B, fruit. C, seed. D, open capsule.

Flowers hermaphrodite or unisexual, usually very small. Perianth-segments 6, in 2 whorls, or rarely only 3, usually glumaceous. Stamens 6 or 3, free; anthers 2-celled, basifixed, opening lengthwise; pollen in tetrads. Ovary superior, 1-celled or 3-celled; styles and stigmas 1 or 3. Ovules ascending or parietal,

3 or more. Fruit a dry capsule. Seeds sometimes tailed, with a small straight embryo in the middle of endosperm.

World-wide distribution, mostly in temperate and cold or montane regions, often in damp places.

Leaves flat, hairy on the margin with a closed basal sheath; ovary 1-celled, with 3 subbasal ovules 1. *Luizula*
Leaves subterete, glabrous, with an open basal sheath; ovary subcompletely 3-celled, with several ovules in each cell 2. *Juncus*

1. LUZULA DC.—F.T.A. 8: 95.

Roots fibrous; leaves in a basal rosette, linear-lanceolate to elongate-linear, acute, up to 20 cm. long and 5 mm. broad, about 7-nerved, ciliate when young, at length glabrous; inflorescence capitate or clusters of flowers pedunculate; leafy bracts subtending the inflorescence densely villous inside towards the base; floral bracts acutely acuminate, long-ciliate, as long as the perianth-segments, the latter very dark brown, acuminate; capsule ovoid-trigonus, mucronate, 2 mm. long

campestris var. *Mannii*

L. campestris var. *Mannii* Buchenau—F.T.A. 8: 96; Buchenau in Engl. Pflanzenr. 4, 36: 87.
Camerouns Mt., 10,000 ft. (Dec.)! Fernando Po: top of Clarence Peak (Dec.)! Also on Mt. Elgon, E. Africa. Exsicc.—Mann 658; 1467; 2108.

2. JUNCUS Linn.—F.T.A. 8: 92.

Leaves in a basal rosette, linear-filiform, acute, about 3 cm. long; flowers 4–8 in a pedunculate cluster; subtending bract subulate-linear, about 2 cm. long; floral bracts ovate, subulate-acuminate; perianth-segments acuminate, membranous, with recurved tips; stamens 3; capsule ovoid-trigonus, brown, much shorter than the perianth; seeds ellipsoid, not tailed 1. *capitatus*

Leaves few, basal, terete, about 30–40 cm. long, acute; stems terete, wiry, terminated by a cyme of small flowers subtended by a subulate terete leaf about 10 cm. long which expands into a membranous wing at the base about 3 cm. long; bracts lanceolate, chaffy, about 5 mm. long; perianth-segments lanceolate, acute, pale green; stamens 6; capsule as long as or longer than the perianth; seeds shortly tailed at one end 2. *maritimus*

1. *J. capitatus* Weig.—F.T.A. 8: 95; Buchenau in Engl. Pflanzenr. 4, 36: 256.
Camerouns Mt., 7,000 ft. (Dec.)! Also in Abyssinia, North Africa, Atlantic Islands and S. Europe. Exsicc.—Mann 2094.
2. *J. maritimus* Lam.—F.T.A. 8: 93; Buchenau l.c. 154, fig. 79.
Senegal! Central Sahara: Tibeghun, around salt water pools of the oasis, 2,500 ft. (Mar.)! Maritime and salt pans in desert areas, in South Africa and in the North Temperate Zone, Western India. Exsicc.—Heudelot 511. Chipp 94.

183. CYPERACEAE

Perennial or rarely annual herbs, usually in damp or marshy habitats, often tufted or from a creeping rhizome; stems solid or rarely hollow, often triquetrous, mostly simple below the inflorescence. Leaves usually in a basal tuft or crowded on the lower part of the stem, with a closed or open sheath at the base and a narrow grass-like blade, rarely the blades entirely reduced; ligule very rare. Flowers very small and inconspicuous, hermaphrodite, or unisexual and monoecious or very rarely dioecious, arranged in small spikes (spikelets), and each usually solitary within a bract (glume); bracts (glumes) distichously or spirally arranged; rarely the female spikelets reduced to 1 bract and 1 flower; spikes variously umbellate, paniculate or rarely spicately arranged; inflorescence subtended by one or more usually leaf-like involucre bracts. Perianth reduced to scales, bristles or hairs, very rarely subpetaloid, often absent. Stamens hypogynous, 3 or fewer, very rarely more or numerous; filaments free; anthers basifixed, oblong or linear, 2-celled, opening lengthwise by a slit. Ovary superior, 1-celled; style with 2 or 3 branches or 2–3-toothed; ovule solitary, erect from the base of the ovary, anatropous. Fruit nut-like, indehiscent, that from a 2-lobed style often more or less 2-sided, that from a 3-lobed style often 3-sided. Seed erect, with a small embryo and abundant mealy or fleshy endosperm.

A very large family distributed throughout the world, mostly dominant in damp or marshy places, especially in temperate and cold regions.

*Fertile flowers with perfect stamens :

†Hypogynous scales or bristles present, sometimes (*Ascolepis*) united into one and embracing the flower :

‡Hypogynous scales or bristles not united into one :

Hypogynous bristles (but no scales) present :

Style-base confluent with and passing gradually into the ovary and nut

1. *Scirpus*

Style-base often swollen and always abruptly contracted into the ovary and nut :

Empty lower glumes of the spikelet 1-2 ; stem ending in a solitary spikelet

2. *Eleocharis*Empty lower glumes of the spikelet 3 ; stem ending in panicles, corymbs or heads of spikelets 3. *Rhynchospora*

Hypogynous scales present, either with or without bristles :

Hypogynous scales not anterior and posterior 4. *Fuirena*

Hypogynous scales anterior and posterior :

Leaves and the bracts subtending the heads narrow 5. *Lipocarpa*Leaves and the bracts subtending the heads broad and foliaceous, with strong spaced nerves 6. *Mapania*‡Hypogynous scales united into one and embracing the flower, longer than the glume 8. *Ascolepis*

†Hypogynous scales or bristles absent :

Glumes arranged in more than 2 rows (i.e. in more than one plane) :

Style-base not passing gradually into the ovary or nut :

Style-base not persistent on the nut 9. *Fimbristylis*

Style-base persistent on the nut :

Style-base minute, discoloured 10. *Bulbostylis*Style-base large 2. *Eleocharis*

Style-base passing gradually into the ovary or nut :

Spikelets of many perfect flowers 1. *Scirpus*Spikelets 1-flowered ; glumes 4 to the spikelet 11. *Remirea*

Glumes arranged in 2 rows (i.e. in one plane) :

Style 3-branched :

Rhachilla persistent 12. *Cyperus*Rhachilla deciduous in one piece 13. *Mariscus*Rhachilla breaking up into as many joints as nuts 14. *Torulinum*

Style 2-branched :

Style not enlarged at the base :

Spikelets 1-2-flowered 15. *Kyllinga*

Spikelets several- to many-flowered :

Nut compressed dorsally 16. *Juncellus*Nut compressed laterally 17. *Pycreus*Style much enlarged at the base ; spikelets 1-flowered 7. *Hypolytrum*

**Fertile flowers without stamens :

Nut not enclosed in a utricle :

Nut surrounded at the base by numerous hairs or bristles 18. *Catagyna*

Nut not surrounded by hairs or bristles :

Nut sessile (not supported on a gynophore or disk) :

Inflorescence corymbose 7. *Hypolytrum*Inflorescence capitate 6. *Mapania*

Nut supported on a gynophore or disk :

Inflorescence spiciform or paniculate 19. *Scleria*Inflorescence capitate 6. *Mapania*Inflorescence of small axillary clusters 20. *Diplacrum*Nut enclosed in a utricle 21. *Carex*Genus of uncertain position (see fig. 349, p. 494) 22. *Micradracoides*1. *SCIRPUS* Linn.—F.T.A. 8 : 446.

Spikelets solitary on each stem, subtended by 1 short setaceous bract :

Spikelets up to 1.5 cm. long, ovoid to oblong ; glumes persistent, rich red-brown, obovate, rather rounded and subobtusate at the apex ; plants usually over 25 cm. high ; leaves much shorter than the stems, almost filiform ; nut suborbicular, black and shining, about 1 mm. long 1. *briziformis*

Spikelets about 0.5 cm. long, ovoid ; glumes deciduous, dull brown or straw-coloured ; plants up to 20 cm. high :

Nut broadly obovoid, dark brown, faintly verrucose ; glumes ovate, pale coloured, not densely arranged on the spikelets 2. *verruculosus*Nut narrowly obovoid ; glumes obovate, broadly triangular at the apex, dark brown, with a hyaline apex, densely arranged on the spikelet 3. *Issolepis*

Spikelets few to many on each stem :

Cluster of spikelets sessile on the stems :

Glumes produced into a long somewhat recurved bristle at the apex ; spikelets several in each head, up to 8 mm. long ; bract-leaves up to 10 cm. long, scabrid on the margin 4. *squarrosus*

Glumes not produced at the apex :

Spikelets very small, clustered into a terminal head less than 0.5 cm. across ; 3 subulate bracts subtending the head not exceeding 5 cm. long 5. *kyllingioides*

Spikelets comparatively large and clustered into lateral heads about 1.3 cm. diam. ; bract 1, resembling a continuation of the stem and often exceeding it in length :

Hypogynous bristles present ; stems thick ; spikelets narrowly ovoid, about 1 cm. long ; glumes broadly ovate, acute, margined with brown 6. *mucronatus*

Hypogynous bristles absent :

Glumes acutely acuminate :

Stems slender, not articulated, about 1.5 mm. diam. ; nutlet transversely ribbed 7. *supinus*

Stems stout, articulated, about 6-8 mm. diam. ; nutlet smooth 8. *articulatus*

Glumes at most mucronate-subacute ; stems slender, the part above the cluster much longer than that below ; nutlet finely transversely ribbed or wrinkled 9. *praelongatus*

Cluster of spikelets, or most of them, pedunculate :

Spikelets not in clusters, ovate to lanceolate, longer than broad :

Stems sharply triangular, bearing 2 or 3 long well-developed leaves ; bract-leaves acutely keeled ; spikelets both sessile and pedunculate, cylindric, up to 2 cm. long ; glumes caudate-acuminate, keeled ; nutlet obovoid, smooth 10. *maritimus*

Stems terete, without or with very small leaves :

Spikelets nearly all pedunculate on the rays, narrowly ovoid, about 1 cm. long ; glumes long-mucronate, brown with membranous margins nutlet obovoid, smooth 11. *littoralis*

Spikelets sessile on the rays, shortly ovoid, about 8 mm. long ; glumes shortly mucronate, margins scarcely membranous ; nutlet black and smooth 12. *brachyceras*

Spikelets sessile on the rays, lanceoloid, nearly 1 cm. long ; glumes long-mucronate, broad, membranous, with jagged ciliate margins ; nut brown 13. *lacustris*

Spikelets in close globose clusters :

Stems triquetrous ; bract-leaves very long, serrulate on the margin ; clusters of spikelets pedunculate ; glumes with rather a thick acumen ; nutlet narrow, triquetrous, smooth 14. *cubensis*

Stems terete ; bract-leaves very short ; clusters of spikelets unequally pedunculate ; glumes with a fine apiculus, dark purplish-brown ; nutlet smooth 15. *Holoschoenus*

1. *Scirpus briziformis* Hutch. in Kew Bull. 1936 : ined. *Scirpus spadiceus* Boeck. ; Chev. Bot. 704 ; not of Linn. A slender sedge up to 1 ft. high, with the appearance of a *Briza* ; heads russet-brown.
French Guinea : Futa-Jallon ! French Sudan : Koulikoro (Oct.) ! Sierra Leone : Regent (Dec.) ! Waterloo (Oct.) ! Foni Plains, Brookfields (Oct.) ! Tombo (Jan.) ! Karina (Oct.) ! Also in Ubangi-Chari Region and in Haiti, West Indies. Exsicc.—Morson. Sc. Elliot 4034. Lane-Poole 400. Deighton 999 ; 2140. *Glanville* 8. *Azelius*.
2. *S. verruculosus* Steud.—F.T.A. 8 : 450. A glabrous annual ; stems tufted.
Senegal. Also in S. Africa. Exsicc.—Leprieur.
3. *S. isolepis* Boeck.—F.T.A. 8 : 459. A glabrous tufted annual about 1 ft. high with setaceous stems and leaves.
Senegal. Also in E. Sudan, South Tropical and S. Africa, and in India. Exsicc.—Leprieur 9. *Perrottet*.
4. *S. squarrosus* Linn.—F.T.A. 8 : 458. A small glabrous tufted annual up to about 1 ft. high.
French Sudan : Koulikoro (Oct.) ! N. Nigeria : Nupe ! Also in N.E. and East Tropical Africa, Madagascar, India and Malaya. Exsicc.—Barter 761, partly. Chev. 2461.
5. *S. kyllingioides* Boeck.—F.T.A. 8 : 457 ; Chev. Bot. 704. Glabrous perennial, sometimes with slender stolons.
Senegal. French Sudan : between Banankalidow and Bama (June) ! Also in East Tropical Africa and India. Exsicc.—Lécard 41 ; 106 ; 110 bis. Chev. 942.
6. *S. mucronatus* Linn.—F.T.A. 8 : 454 ; Chev. Bot. 704. Stems tufted, up to 2½ ft. high.
French Guinea : Futa-Jallon, Labé (Apr.) ! Douné (Dec.) ! Widely spread from Europe eastwards to Polynesia and Japan. Also in French Cameroons. Exsicc.—Chev. 12341. *Caille in Herb.* Chev. 14760.
7. *S. supinus* Linn.—F.T.A. 8 : 452 ; Chev. Bot. 705. Annual with tufted stems without nodes ; spikelets in a dense lateral cluster.
Senegal : Kaédi (Dec.) ! S. Nigeria : near Galarige (Oct.) ! Lagos ! Widely distributed in the Old World, from Europe to the Cape and Australia. Exsicc.—Chev. 2447. *Golding* 30. *Dalziel* 1307. (See Appendix).
8. *S. articulatus* Linn.—F.T.A. 8 : 453, partly. A thick articulated-stemmed sedge ; leaf-bases membranous ; spikelets in dense sessile clusters.
N. Nigeria : Katagum distr., in mud near lagoons ! Extends to the Mascarene Islands and India. Exsicc.—Dalziel 242.
9. *S. praelongatus* Poir. Encycl. 6 : 764. *S. articulatus* C.B.Cl.—F.T.A. 8 : 453, partly ; Chev. Bot. 704. *Isolepis senegalensis* Hochst. *Schoenoplectus senegalensis* Palla. Stems slender, pithy, bearing dense clusters of spikelets in the lower part or towards the middle ; glumes often slightly mottled.
French Guinea : Toumancon ! Senegal : Tamboukane ! Richard Toll (Feb.) ! Gold Coast : Achimota (Nov.) ! N. Nigeria : Bauchi Plateau ! Also in Angola, Damaraland, Shari-Chad, Eastern Sudan, Abyssinia, Uganda, Nyassaland and Lower Zambesi and in India. Exsicc.—Dollinger 13. *Heudelot* 319. Chev. 2445. *Lely* p. 467. *Pobéguin*, Irvine 1523. (See Appendix).
10. *S. maritimus* Linn.—F.T.A. 8 : 455. Stems 1 ft. or more high ; glumes pale brown, with subulate tips, Senegal : Walo country ! Cosmopolitan distribution. Exsicc.—Roger 71.

11. *S. littoralis* Schrad.—F.T.A. 8: 456. Glabrous perennial, with slender rhizomes; stems up to 3 ft. high; glumes rusty-brown.
Senegal! Common in the Old World to North Australia. Exsicc.—Heudelot 533.
12. *S. brachyceras* Hochst. in Flora 24, Intell. 1: 21 (1841); A. Rich. Tent. Fl. Abyss. 2: 496 (1851). *S. corymbosus* Heyne ex Roth, not of Linn.—F.T.A. 8: 455. Up to 5 ft. high, with horizontal rhizomes.
Senegal! French Sudan: Middle Niger, at Tenankan, in inundated grassland (Sept.)! Soule, near Macina (May)! S. Nigeria: Lokom, Bamenda distr. (June)! Fernando Po: Moka, crater lake, 5,700 ft.! Extends to India and S. Africa. Exsicc.—Leprieux 485. *Lean* 7; 105. *Maitland* 1546. *Ezell* 802.
13. *S. lacustris* Linn.—F.T.A. 8: 454. Rhizome horizontal; stems up to 6 ft. high.
Sierra Leone. Widely spread nearly all over the world, but rare in Africa. Exsicc.—Afzelius.
14. *S. cubensis* Poeppig & Kunth—F.T.A. 8: 451. Stems 1–2 ft. high, stout, trigonous at the top, without nodes.
French Sudan: Middle Niger! N. Nigeria: Nupe! Eastern Sudan (Nile Basin), Uganda and Angola; common in America. Exsicc.—Barter 1068. *Lean* 56.
15. *S. holoschoenus* Linn. Sp. Pl. 49. About 2½ ft. high or more with rush-like stems.
French Sudan: Tamanrasset, 4,320 ft., side of irrigation ditch! Arak, 1,775 ft. (Mar.)! Widely distributed. Exsicc.—Chipp 18. *Meinertzhagen* 228.

Imperfectly known species.

Scirpus occultus C.B.Cl. in Bull. Soc. Bot. Fr. 54: Mém. 8: 28 (1907). Stemless, clustered.
French Sudan: Langana, banks of Niger (Jan.)! Exsicc.—Chev. 265.

2. ELEOCHARIS R.Br.—F.T.A. 8: 404.

Spikes elongated, 3 cm. long or more:

Stems transversely septate, remotely jointed, tufted, about 35–40 cm. long, terete; rhizome very short; spike 3–4 cm. long; glumes ovate-elliptic, about 6 mm. long, with thin margins, finely keeled; hypogynous bristles several, retrorse barbellate; nut smooth, capped by the persistent triquetrous base of the style

1. *plantaginea*

Stems neither transversely septate nor jointed; nutlets with the epidermal cells conspicuous and arranged in vertical rows:

Hypogynous scales about one-third as long as the nut, slightly retrorse-barbellate at the apex; glumes obovate, with membranous margins; stems subterete, slender, about 45 cm. long

2. *nupeensis*

Hypogynous scales about as long as or longer than the nut, retrorse-barbellate nearly the whole length:

Stems triangular; glumes broadly obovate-orbicular, the exposed portion broader than long, not striate

3. *mutata*

Stems flattened, 3-winged towards the apex; glumes narrowly obovate, the exposed portion longer than broad, striate

4. *fistulosa*

Spikes comparatively short in relation to their breadth, up to 1.5 cm. long:

Stems not filiform, rigid or fairly rigid, 10 cm. or more long:

Hypogynous bristles present; nut brown or reddish, not trigonous:

Glumes narrowly obovate, few and very laxly arranged, pale brown towards the margins; spikes narrow, lanceolate

5. *variegata*

Glumes rounded, numerous in very close spirals, of a uniform colour; spikes rather flat, up to 1 cm. long, cylindric or ovoid

6. *caribaea*

Hypogynous bristles absent; nut white or whitish, trigonous; spikes lanceolate, about 6 mm. long; glumes with membranous margins and dark brown keel

7. *complanata*

Stems filiform:

Spikes more than 1-flowered, about 3 mm. long:

Glumes few (about 8) and broadly ovate, reddish-crimson; subtending bract small; stems up to 6 cm., slender; nut obovoid, pale, smooth; hypogynous scales half as long as the nut, retrorse-scarbid

8. *minima*

Glumes more numerous and narrow:

Glumes reddish, keeled; subtending bract small; stems up to 6 cm. long, very slender; nut obovoid, dark reddish-brown, shining, slightly areolate; hypogynous scales three-quarters as long as the nut, minutely retrorse-scarbid

9. *atropurpurea*

Glumes brownish or straw-coloured, keeled, very small; subtending bract very small; stems up to 10 cm. long; nut rounded-obovoid, striate (but not latticed); hypogynous scales nearly as long as the nut, minutely scarbid

10. *Schweinfurthiana*

Spikes 1-flowered; stems very numerous, elongated:

Stems septate

11. *Neumanniana*

Stems not septate

12. *Cailliei*

1. *Eleocharis plantaginea* R.Br.—F.T.A. 8: 405; Chev. Bot. 700. Flowering stems 1–1½ ft. high, with short leaf-sheaths towards the base.

French Guinea: Futa-Jallon (Sept.)! French Sudan: Bourem Island, on a branch of the Niger (July)! Tenankan (Sept.)! Also in Eastern Asia, the Mascarene Islands and Angola. Exsicc.—Chev. 1234; 18636. *Lean* 104. (See Appendix).

2. *E. nupeensis* Hutch. in Kew Bull. 1936: ined. *E. mitrata* var. *africana* C.B.Cl.—F.T.A. 8: 406. Very like the above but stems more slender and not jointed.

N. Nigeria: Nupe, common in swamps! Exsicc.—Barter 1040.

3. *E. mutata* Roem. & Schult. Syst. 2: 155 (1817); Svenson in Rhodora 31: 183. *Scirpus mutatus* Linn. *E. fistulosa* C.B.Cl. in F.T.A. 8: 406, partly, not of Link. Remarkable for the sharply triangular stems.

- Sierra Leone: Bagroo River (Apr.)! Mambolo, in swamp rice field (Jan.)! Port Loko Creek, frequent in patches in brackish tidal swamp (Mar.)! Liberia: Duport (Nov.)! S. Nigeria: Lagos Island, abundant in salt water swamps! Also in French Cameroons, E. Sudan, West Indies, Central and Northern South America. Exsicc.—*Mann* 893. *Deighton* 978. *Glanville* 211. *Macgregor* 327. *Barter* 2234. *Linder* 1444.
4. *E. fistulosa* Link.—F.T.A. 8: 406, partly; Chev. Bot. 700; Svenson in *Rhodora* 31: 152. Stems rather weak and compressed, winged towards the apex; leaf-sheaths up to 6 in. long.
- Casamance; Bignona (Feb.)! Senegal! Sierra Leone: stagnant pond near Erimakuna (Mar.)! Near Gene (Nov.)! Ronietta (Nov.)! Pendembu (July)! Near Njala (Oct.)! Gold Coast: Sesilamang (Feb.)! Extends to S. Africa, Mascarene Islands, eastwards to Australia, and in the West Indies and tropical S. America. Exsicc.—*Chev.* 2432. *Heudelot* 320. *Se. Elliot* 4453. *Deighton* 339; 2814. *Thomas* 839; 5296; 5605. *A. S. Thomas* D145. (See Appendix).
5. *E. variegata* Presl in *Oken Isis* 21: 269 (1828); Kunth Enum. Pl. 2: 153. Stems tufted up to 1½ ft. high. Sierra Leone: edge of dried up marsh between Serabu and Mowoto (Apr.)! Also in the Congo and Angola and in Madagascar and the eastern tropics. Exsicc.—*Deighton* 1687.
6. *E. caribaea* Blake in *Rhodora* 20: 24 (1918). *Scirpus caribaeus* Rottb. (1772). *E. capitata* R.Br., partly.—F.T.A. 8: 407; Stapf 663; Chev. Bot. 699. *Scirpus capitatus* Willd. partly (1798), not of Linn. A tufted herb up to 1 ft. high; peduncles wiry.
- Senegal! Casamance; Niomoun (Jan.)! Sierra Leone: Bagroo River (Apr.)! Kayinti (Mar.)! Mano Salya (Dec.)! Liberia: Cape Palmas (July)! S. Nigeria: Lagos! Widely spread through warmer regions of the world. Exsicc.—*Chev.* 2452. *Roger. Mann* 891. *Glanville* 214. *Deighton* 281. *Vogel* 7. *Macgregor* 337.
7. *E. complanata* Boeck.—F.T.A. 8: 409; Chev. Bot. 699. Stems tufted up to 9 in. high.
- French Sudan: Koulikoro (Oct.)! Ivory Coast: Baouli Circle (Aug.)! N. Nigeria: Nupe, in rice fields! S. Nigeria: Lagos (Oct.)! Also in E. Sudan. Exsicc.—*Chev.* 2454; 2376. *Barter* 1574. *Dalz.* 1287.
8. *E. minima* Kunth Enum. 2: 139. *E. Trilophus* C.B.Cl.—F.T.A. 8: 409. A tiny plant like the following, but with fewer and broader glumes.
- Senegal: inundated lands (Jan.)! Also in tropical America. Exsicc.—*Roger* 113 (partly).
9. *E. atropurpurea* Kunth.—F.T.A. 8: 407. A tiny annual with filiform leaves and peduncles.
- Senegal: inundated lands (Jan.)! Widely distributed. Exsicc.—*Roger* 113 (partly).
10. *E. Schweinfurthiana* Boeck. in *Flora* 1879: 562. *E. microcarpa* C.B.Cl. in F.T.A. 8: 410; Chev. Bot. 700; not of Torrey. A glabrous annual with tufted filiform stems and tiny spikes.
- French Sudan: North Yatenga (Aug.)! Also in Eastern Sudan and Uganda. Exsicc.—*Chev.* 24806.
11. *E. Neumanniana* Boeck. in *Engl. Bot. Jahrb.* 5: 92 (*Heliocharis*); Stapf 663. A remarkable species with long filiform septate stems and 1-flowered spikes.
- Liberia: Monrovia! Exsicc.—*Naumann*.
12. *E. Gaillei* Hutch. in *Kew Bull.* 1936: ined. Like the last but the stems not septate; both species allied to *E. capitata* Kunth, from Eastern Tropical South America.
- French Guinea! Exsicc.—*Caille* in *Herb. Chev.* 14957.
- Besides the above species, Maire records *E. palustris* Roem. & Schult. from the Hoggar Mts., just within the boundary of our Flora.

3. RHYNCHOSPORA Vahl—F.T.A. 8: 478.

Spikelets arranged in large panicles; bracteoles with very long subulate points; spikelets narrowly lanceolate, about 8 mm. long; glumes tawny, with subulate points; leaves broadly linear, the sheath transversely ribbed at the top; nutlet obovoid, brown, with a broad conical beak nearly as long 1. *corymbosa*

Spikelets arranged in small corymbs or heads:

Spikelets in small corymbs:

Nutlet smooth:

Glumes white, broadly ovate, slightly mucronate; spikelets about 8 mm. long, lower glumes soon falling off; nutlet suborbicular, capped by the broad saddle-shaped style-base 2. *candida*

Glumes straw-coloured, subulate-acuminate, acumen scabrid; nutlet suborbicular, smooth, capped by the small depressed style-base 3. *Barteri*

Nutlet transversely wrinkled or rugose:

Nutlet transversely wrinkled:

Leaves almost filiform with a conspicuous nerve; corymbs subsessile, of about 3–5 spikelets; nutlet nearly white 4. *Deightonii*

Leaves broader, with several nerves; corymbs pedunculate, of several spikelets; nutlet pale straw-coloured 5. *Schroederi*

Leaves narrow with several nerves; corymbs subsessile; nutlet yellow-brown

6. *micrantha*

Nutlet rugose and pitted; leaves almost filiform; spikelets nearly sessile

7. *tenerima*

Spikelets in heads:

Head solitary, subtended by 2–3 leaf-like bracts of unequal length; bracts densely ciliate towards the base; leaves about $\frac{1}{2}$ as long as the stems; nutlet obovoid, smooth, capped by the very small persistent style-base 8. *Wallichiana*

Heads 2 or more together, the subtending leaf-like bracts at most scabrid on the margin; leaves elongated; nutlet broadly obovoid, smooth, capped by the very narrow awl-like persistent style-base 9. *cyperoides*

1. *Rhynchospora corymbosa* Britton in *Trans. New York Acad. Sci.* 11: 86 (1892). *Scirpus corymbosus* Linn. *R. aurea* Vahl—F.T.A. 8: 480; Chev. Bot. 708; Stapf 664. Panicle with tiers of pedunculate clusters of narrow spikelets; leaves with sharply serrulate edges.

Throughout the area and in Tropical Africa generally; widely distributed in the warmer regions of the world. Exsicc.—*Heudelot* 344. *Dalz.* 1306; 8431. *Vogel* 129. *Sc. Elliot* 3861. *Barter* 1564. *Chev.* 22339. (See Appendix).

2. *R. candida* C.B.Cl.—F.T.A. 8: 481; Chev. Bot. 709. Stems slender, with small corymbs of spikelets; glumes white, closely imbricate.

French Guinea: Kouroussa (Apr.)! Douné! Sierra Leone: Mayoso (Aug.)! S. Nigeria: Lagos! Extends to Madagascar and in Tropical South America. Exsicc.—*Pobéguin* 693. *Thomas* 1418. *Barter* 20178. *Chev.* 14658.

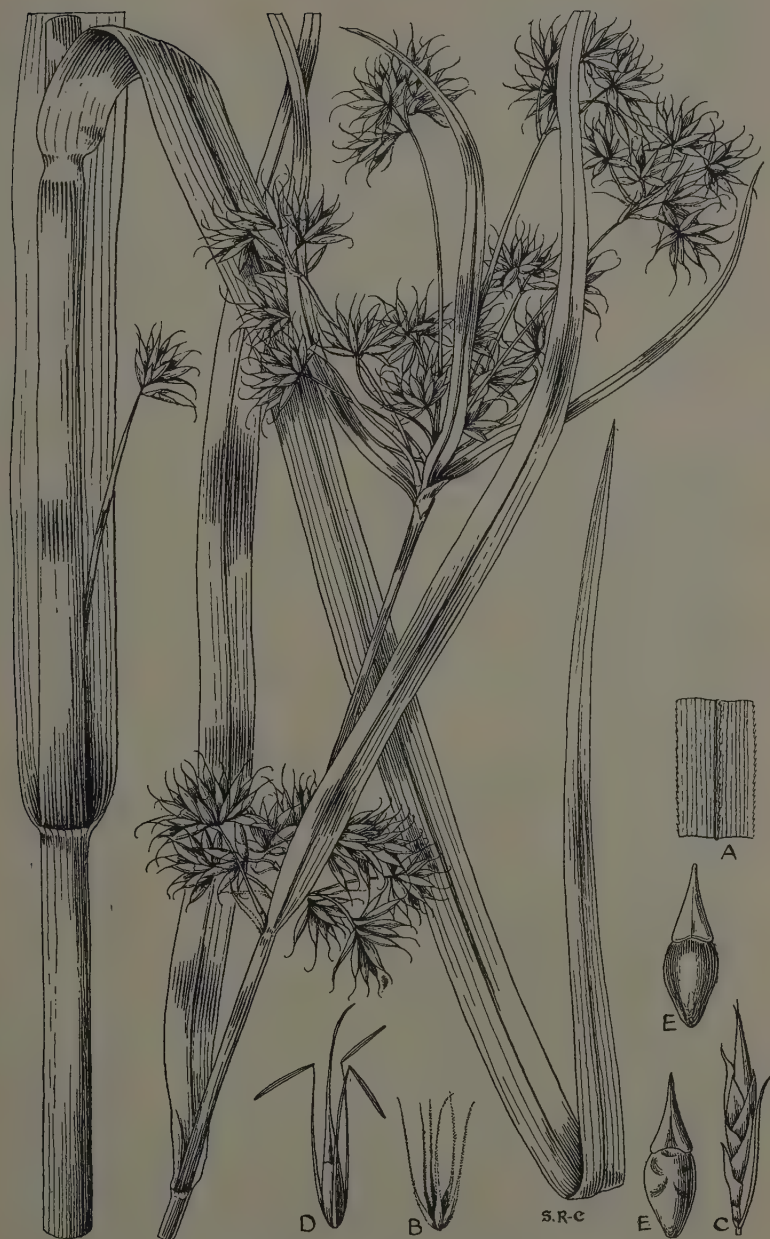


FIG. 343.—*RHYNCHOSPORA CORYMBOSA* Britton (CYPERACEAE).

A, back of leaf. B, bracteoles. C, spikelet. D, stamens and pistil. E, nutlets.

3. *R. Barteri* C.B.Cl.—F.T.A. 8: 482. Stems numerous in each tuft; leaves almost filiform, nearly as long as the stems.
Sierra Leone: Kitchom (Jan.)! N. Nigeria: Nupe! Exsicc.—Barter 1010. Deighton 945.
4. *R. Deightonii* Hutch. in Kew Bull. 1936: ined. A slender herb up to 1 ft. high.
Sierra Leone: Malema (Nov.)! Marsh between Gboyama and Bendu (Apr.)! Newton (Nov.)! Ivory Coast: Baoulé Nord (Aug.)! Exsicc.—Deighton 326; 1449; 1633. Chev. 22316.
5. *R. Schroederi* K. Schum. ex C.B.Cl. in Engl. Bot. Jahrb. 38: 135. *R. Schroederi* C.B.Cl.
Sierra Leone: Mabonto-Bunbuna, fairly common (Aug.)! Togo: Sokode (Nov.)! N. Nigeria: Kabba Road, in wooded glades near water (Oct.)! Exsicc.—Deighton 1401. Parsons 27. Schroeder 147.
6. *R. micrantha* Vahl—F.T.A. 8: 481.
Senegal. Also in Canary Islands and tropical America. Exsicc.—Isert.
7. *R. tenerima* Spreng. Syst. Cur. Post. 26 (1827). Stems slender, tufted, about 6 in. high.
Sierra Leone: Materbol, N. Prov. (Oct.)! Also in tropical S. America. Exsicc.—Glanville 24.
8. *R. Wallichiana* C.B.Cl.—F.T.A. 8: 478; Stapf 664. Spikelets very small and inconspicuous in small heads.
Sierra Leone: Mano Salija (Nov.)! Liberia: Duport (Nov.)! Grand Bassa, in sandy savannah (July)! Also in Gabon, Zanzibar, Port. E. Africa and Mascarene Islands; India to Japan and Northern Australia. Exsicc.—Deighton 341. Vogel 105. Bequaert in Herb. Linder 1460.
9. *R. cyperoides* Britton—F.T.A. 8: 479; Chev. Bot. 709. Up to 4 ft. high, tufted; styles long and conspicuous in the heads; glumes shining.
Senegal: sea coast at Niakoulourab (Dec.)! Sierra Leone: Samarank, Rokel River, sandy soil at edge of tidal swamp (Mar.)! Mano Salija (Dec.). Liberia: Duport (Nov.)! Also in Angola, Victoria Falls, S. Africa, Mascarenes, and common in America. Exsicc.—Chev. 2451. Glanville 210. Deighton 283. Linder 1471.
- Imperfectly known species.*
- R. senegalensis* Steud.—F.T.A. 8: 482.
Senegal. Exsicc.—Leprieur.—Type not found in Paris; probably not belonging to this genus.

4. *FUIRENA* Rottb.—F.T.A. 8: 461.

- Glumes 1-nerved or very faintly 3-nerved; keel ending in a short mucro; stem-glumes linear-lanceolate, subacute, up to 6 cm. long; leaf-sheath truncate, glabrous; spikelets 1–1.5 cm. long; subtending bract linear-subulate, minutely scabrid-ciliate; hypogynous bristles longer than the nut, minutely retrorse-scabrid .. 1. *stricta*
- Glumes prominently 3-nerved:
- Acumen of the glume as long as or nearly as long as the lamina, pilose; stem and leaves pubescent; ligule shortly tubular within the blade; blade up to 15 cm. long, several-nerved; hypogynous bristles about as long as the nut, brown; nut sharply triangular, ivory-white 2. *glomerata*
- Acumen of the glume nearly as long as the lamina, puberulous; stem and leaves pubescent; ligule short; blade 5–7 cm. long, 5-nerved; hypogynous bristles absent 3. *Moiseri*
- Acumen of the glume much shorter than the lamina, slightly pubescent; stem and leaves pubescent or glabrous; ligule short and oblique; blade linear-lanceolate, up to 20 cm. long, 5-nerved; inner hypogynous bristles as long as the nut, obovate; nut pale, triquetrous 4. *umbellata*
1. *Fuirena stricta* Steud.—F.T.A. 8: 465; Chev. Bot. 705. Leaves with only one main nerve.
French Guinea: Kouroussa (Jan.)! Sierra Leone: near Kambia (Jan.)! Marsh near Konta (Aug.)! N. Nigeria: Nupe, pools on high rocks! Extends to East Africa and the Comoro and Mascarene Islands. Exsicc.—Pobéguin 622. Deighton 926; 1240. Barter 1562.
2. *F. glomerata* Lam.—F.T.A. 8: 465; Chev. Bot. 705. Leaves prominently 5-nerved; glumes soon falling off, leaving the deeply pitted rachis.
Senegal! Sierra Leone: Mahela (Dec.)! Tombo (Jan.)! Gold Coast: Accra! S. Nigeria: Lagos Island! Widely distributed in the Old World tropics. Exsicc.—Heudelot 556. Chev. 2433. Sc. Elliot 3982. Warnecke 228. Deighton 993. Brown 365. Barter 2224.
3. *F. Moiseri* Turill in Kew Bull. 1925: 71. Very like the last but with smaller glumes gradually narrowed into the acumen.
N. Nigeria: loc.?! Exsicc.—Moiser 157.
4. *F. umbellata* Rottb.—F.T.A. 8: 466; Chev. Bot. 705; Stapf 664. *F. seriata* C.B.Cl.—Chev. Bot. 705. Lower leaves reduced to sheaths; panicle softly pubescent.
Common throughout the area in swamps and on the banks of streams; very common in all tropical and subtropical regions. (See Appendix).

5. *LIPOCARPHA* R.Br.—F.T.A. 8: 468.

- Glumes very acutely long-subulate-pointed, the points at length recurved; spikelets narrowly ovoid, purplish, about 6 mm. long, 3–5 to each head; stems deeply grooved; leaves up to nearly half as long as the stems; basal sheath obliquely truncate; nutlet oblong-elliptic, closely pitted 1. *Barteri*
- Glumes shortly or abruptly mucronate or gradually acuminate:
- Glumes abruptly triangular-acute or mucronate:
- Glumes pale, sometimes with minute specks of purple; stems few (1–5) to each tuft of roots, rather stout; spikelets ovoid, several in each head; bract-leaves unequal, the longest about 10 cm. long; leaves usually short, not more than one-third as long as the stems 2. *senegalensis*
- Glumes purplish; stems numerous to each tuft of roots, wiry and thin:
- Glumes acute; spikelets at length nearly cylindric, several; bract-leaves up to 7 cm. long; leaves sometimes much reduced, but more often up to one-third as long as the stems 3. *triceps*
- Glumes very obtuse, broadly obovate; spikelets as above; bract-leaves up to 10 cm. long; leaves about quarter as long as the stem 4. *Prieuriana*
- Glumes gradually and broadly acuminate, straw-coloured; spikelets not very separated

from one another, shortly ovoid-globose; stems slender; leaves 1-2, the basal sheath very oblique and thin; one leaf-like bract much longer than the other, almost filiform 5. *albiceps*

1. *Lipocarpa Barteri* C.B.Cl.—F.T.A. 8: 472. *Kyllinga baouensis* A. Chev. Bot. 698, name only. Stems and leaves wiry, basal sheaths purplish; spikelets appearing bristly.
Ivory Coast: Kodjokoff distr. (Aug.)! N. Nigeria: Nupe! Exsicc.—Barter 1585.
2. *L. senegalensis* Th. & Hel. Durand Syllog. Fl. Congol. 619. *Scirpus senegalensis* Lam. (1791). *L. argentea* R.Br.—F.T.A. 8: 469. Rhizome with stout hairy roots; stems up to about 1 ft. high.
French Sudan: Tabacco (Jan.)! Sierra Leone: various loc.! N. Nigeria: Sokoto (July)! Vom, Banchi Plateau, 3,000-4,500 ft.! S. Nigeria: Shaki (May)! Extends to S. Africa, Mascarenes, Asia and Australia. Exsicc.—Chev. 141. Sc. Elliot 5044. Thomas 842. Don. Deighton 420; 909; 9641; 9655. Dalz. 454. Moiser 184. Dent Young 261. Lely P. 484.
3. *L. triceps* Nees—F.T.A. 8: 470; Stapf 664. *L. filiformis* Kunth. Densely tufted, up to about 2 ft. high; spikelets pale.
Senegal! Sierra Leone: Bonthe Island (Nov.)! Between Mattu and Gbangbama (Nov.)! Liberia: Cape Palmas! Ivory Coast: Baule Nord (Aug.)! N. Nigeria: Nupe! S. Nigeria: Lagos! Tropical Africa generally, India and Tropical America. Exsicc.—Ansell. Chev. 22352. Barter 344; 786. MacGregor 24. Deighton 2267; 2317; 2338. Thonning. Heudelot.
4. *L. Priuriana* Steud.—F.T.A. 8: 471. Habit of preceding.
Senegal! Also in N.E. Tropical Africa. Exsicc.—Leprieux. Perrotet.
5. *L. albiceps* Ridley—F.T.A. 8: 471. Heads white; stems slender up to about 1 ft. high.
N. Nigeria: Baradau, 3,000 ft.! Zaria (July)! Bauchi Plateau, on plains! Also in Chari-Chad, Belgian Congo and South Tropical Africa. Exsicc.—Lely 98; P. 476. Taylor 14.

6. MAPANIA Aubl.—F.T.A. 8: 489.

Flower-clusters subtended by a leaf nearly as long as and similar to the basal leaves:

Heads 4-5 cm. diam., depressed-globose; leaves gradually narrowed to the base, elongate-linear-oblong, 3-4 cm. broad, with 3 principal nerves and fainter ones between, scabrid-serrulate on the margin; spikelets very numerous and densely crowded, up to 1.5 cm. long, scarcely distinguishable from one another in the head

1. *Deistelii*

Heads 4 cm. diam., globose; leaves broadly elongate-linear, 3-4 cm. broad with distinct transverse veins, scabrid-serrulate on the margin; spikelets numerous but quite distinct from one another in the head, lanceolate in outline, about 1 cm. long 2. *superba*

Flower-clusters subtended by a few small subfoliaceous bracts:

Subtending bracts obscurely nerved, very prominently keeled; rhizome ascending, slender, covered with scale-leaves or their remains and emitting stout smooth roots; leaves with a broad basal sheath 6-8 cm. long, then a "petiole" about 10 cm. long; blade narrowly oblong, about 20 cm. long and 4 cm. broad, with numerous closely parallel nerves and very faint cross-nerves, obliquely acuminate at the apex; flowering stems up to 20 cm. long; bracts surrounding the heads obovate, the largest about 3.5 cm. long; glumes ciliate on the keel; nutlet sub-orbicular, slightly wrinkled 3. *oblonga*

Subtending bracts prominently nerved, obscurely or not keeled:

Leaves at most 2.5 cm. broad, closely scabrid-serrulate on the margins, with 3 main nerves and fainter nerves between, glaucous; peduncles about $\frac{1}{2}$ - $\frac{3}{4}$ as long as the leaves, slender, up to 20 cm. long; subtending bracts ovate-triangular, 1 cm. long; spikelets 5-8 in a head, up to 2 cm. long; glumes keeled, brown

4. *dolichostachya*

Leaves about 4 cm. broad, scabrid-serrulate on the margins, with 3 main nerves, pale green; peduncles slender, about $\frac{1}{2}$ as long as the leaves, up to 15 cm. long; bracts broadly ovate, about 1 cm. long, with membranous margins; spikelets 30-40 in a head, about 1.5 cm. long, crowded; glumes pale brown . . . 5. *Linderi*

Leaves about 8 cm. broad, nearly smooth on the margins, with a broad basal sheath and a narrow "petiole," the blade about 45 cm. long, with 3 main nerves, fainter intermediate nerves and prominent transverse veins; peduncles as long as the "petioles"; bracts ovate-triangular, 1.5 cm. long, closely nerved; spikelets about 20 in a head, about 1 cm. long, crowded; glumes brown . . . 6. *comoensis*

1. *M. Deistelii* K. Schum. in Notizbl. Bot. Gart. Berl. 3: 106. Young leaves purplish; plants about 1½ ft. high.
Liberia: Gbanga (Sept.)! Medina Bumbuma, in moist original forest (Oct.)! Cameroons Mt.: Buea, by brooks, 3,700 ft. (Jan.)! Exsicc.—Linder 671; 1306. Deistel 43; 182.
2. *M. superba* C.B.Cl.—F.T.A. 8: 491.
Ivory Coast: Cavally Basin, Grabo, in the forest under trees (July)! Also in Cameroons and Gabon. Exsicc.—Chev. 19610.
3. *M. oblonga* C.B.Cl.—F.T.A. 8: 491. *M. amplivaginata* K. Schum. Stems with stout adventitious roots peduncles much shorter than the leaves.
S. Nigeria: Oban! Rio del Rey! Barombi! Also in French Cameroons. Exsicc.—Johnston. Preuss 484. Dusen 64. Talb. 714.
4. *M. dolichostachya* K. Schum. in Notizbl. Bot. Gart. Berl. 3: 106. *M. africanu* A. Chev. Bot. 707, not of Boeck. Peduncles very slender and comparatively short; spikelets loose.
Ivory Coast: Cavally Basin; Grabo district, Mt. Copé (July)! Also in French Cameroons. Exsicc.—Chev. 19697.
5. *M. Linderi* Hutch. in Kew Bull. 1936: ined. Herb in deep woods, with white anthers.
Liberia: Du River, Firestone Plantation No. 3 (July)! Gbanga (Sept.)! Near Lange Town (Aug.)! Exsicc.—Linder 114; 351; 586.
6. *M. comoensis* A. Chev. Bot. 708, name only. Leaves very broad, and rounded to the apex; spikelets rather numerous.
Ivory Coast: Lower Comoé, Malamalasso, in dense forest (Mar.)! Exsicc.—Chev. 17498.

7. *HYPOLYTRUM* L. C. Rich.—F.T.A. 8: 486.

Basal leaves numerous: flowering stem leafless in the upper part, the bract-like leaves small and shorter than the inflorescence:

Spikes narrowly oblong, on very slender nearly smooth stems; nutlet narrowly ellipsoid, slightly striate towards the middle; leaves 3-nerved with fainter nerves between, up to 2 cm. broad; inflorescence widely and laxly corymbose

1. *africanum*

Spikes numerous, broadly obovoid, becoming almost globose in fruit, on rather stout markedly scabrid stems; nutlet obovoid, darker in the lower part; leaves as above but under 1.5 cm. broad; inflorescence densely corymbose ..

2. *longiscaposum*

Spikes few, obovoid, on slender peduncles scabrid towards the top; nutlet obovoid, flattened, ribbed ..

3. *senegalense*

Basal leaves reduced or none; flowering stem-leaves 1-2, much longer than the inflorescence, about 2 cm. broad, with 3 more prominent and numerous less prominent nerves, scabrid on the margin; male spikelets narrow, acute at both ends, about 1 cm. long; female spikelets shorter, obovoid, becoming almost globose in fruit; nutlet ellipsoid, minutely mottled ..

4. *heterophyllum*

1. *Hypolytrum africanum* Nees—F.T.A. 8: 488; Chev. Bot. 707; Stapf 665. *H. attiene* A. Chev. Bot. 707. Slightly fragrant, in dense shady woods, growing in tufts; flowering stems very slender from the axils of the lower leaves.

French Guinea: Falaba (Mar.)! Kourila! Sierra Leone: Makonde (Apr.)! Sangasana (Jan.)! Ndijajula, near Njala (Feb.)! Kamabu (May)! Gorahun (Nov.)! Liberia: Gbanga (Sept.)! Yeh River (Oct.)! Ivory Coast: Agniéby Valley and Lower Comoé! Aikpé (Feb.)! Gold Coast: Ancobra River (Dec.)! S. Nigeria: Onitsha! Also in the French Cameroons, Congo, and St. Thomas Island. Exsicc.—Lane-Poole 143. *Sc. Elliot* 4415; 5896; 5686. *Deighton* 450; 1078. *Thomas* 345; 9901; 10499. *Johnson* 1006. *Barter* 1575. *Smyth* 123. *Chev.* 14933; 17363. *Linder* 631; 1004. (See Appendix).

2. *H. longiscaposum* C.B.Cl.—F.T.A. 8: 489; Chev. Bot. 707. Like the last in habit, but stouter flowering stems and shorter and thicker spikelets.

French Guinea: Mamou, in moist forest (Mar.)! Farana! Ditinn! Timbo! Sierra Leone: near Regent (Dec.)! By streams on Talla Hill plateaux, 3,500 ft., 6 miles north of Kundita (Mar.)! Exsicc.—*Dalz.* 8430. *Sc. Elliot* 4014; 5050.

3. *H. senegalense* C.B.Cl.—F.T.A. 8: 488; Chev. Bot. Flowering stems several, slender, with a few leaf-sheaths at the base.

French Guinea: Rio Nunez! Exsicc.—*Heudelot* 747. *Chev.* 16611.

4. *H. heterophyllum* Boeck. *Cyp. Novae* 1: 22. *H. Buchholzianum* Boeck. l.c. *H. nemorum* Spreng. *Syst.* 1: 233, partly; Beauv. Fl. Owar. 2: 13, t. 67; F.T.A. 8: 487; Chev. Bot. 707; Stapf 665; not *Schoenus nemorum* Vahl. *H. latifolium* Benth. in Hook. Niger Fl. 585, not of L. C. Rich. Tufted about 4-6 ft., in swampy places: spikelets very numerous.

Sierra Leone: Mano Salija, edge of marsh (Nov.)! near Topan (Feb.)! Liberia: Sinoe Basin! near Kakatown! Ivory Coast: Cavally Basin; Beriby, on sea coast! S. Nigeria: Lagos (Jan.)! Rio del Rey! Fernando Po (Nov.)! Extends to the Congo Basin and in Tanganyika (Usambara). Exsicc.—*Deighton* 340. *Roadon* 6; 7. *Whyte.* *Millen* 193. *Dalz.* 1304. *Vogel* 206. *Mann* 120. *Chev.* 19955. (See Appendix).

8. *ASCOLEPIS* Nees—F.T.A. 8: 473.

Axis of spikelet without bristles within the flower:

Sheath of hypogynous scale (squame) solid and not open at the top:

Spikelets several to a head and distinct from one another, giving the head a "lobed" appearance, the whole cluster about 1.5 cm. diam.; glumes lanceolate, acute, brownish in the middle, about three-quarters the length of the suborbicular abruptly acuminate hypogynous scale, the latter 3 mm. long; one leaf-like bract much longer than the other, linear-subterete, up to 15 cm. long ..

1. *brasiliensis*

Spikelets crowded into a single "unlobed" head and indistinguishable from one another:

Glumes linear or linear-lanceolate, acute:

Hypogynous scale at most about twice as long as the subtending glume, about 4 mm. long, linear-lanceolate, very acute; heads less than 1 cm. diam.; leafy bracts 2-3, gradually narrowed into the base; leaves subfiliform ..

2. *protea*

Hypogynous scale about 6 times as long as the subtending glume, giving the head the appearance of a double daisy, about 1.4 cm. long, linear; heads 3-3.5 cm. diam.; longer leafy bracts 2 or 3; leaves almost filiform ..

3. *elata*

Glumes obovate, triangular at the apex, about half as long as the hypogynous scale, the latter 5 mm. long, broadly long-acuminate from an elliptic base, straw-coloured; heads about 1.3 cm. diam.; one leaf-like bract longer than the other, up to about 9 cm. long ..

4. *capensis*

Sheath of hypogynous scale (squame) hollow and open at the top, trumpet-like, the tube of the "trumpet" submembranous; leaves filiform; spikelets usually 3 or 4 in a head, the flowers soon falling off and leaving the rather thick finely muricate axis; plants about 15 cm. high ..

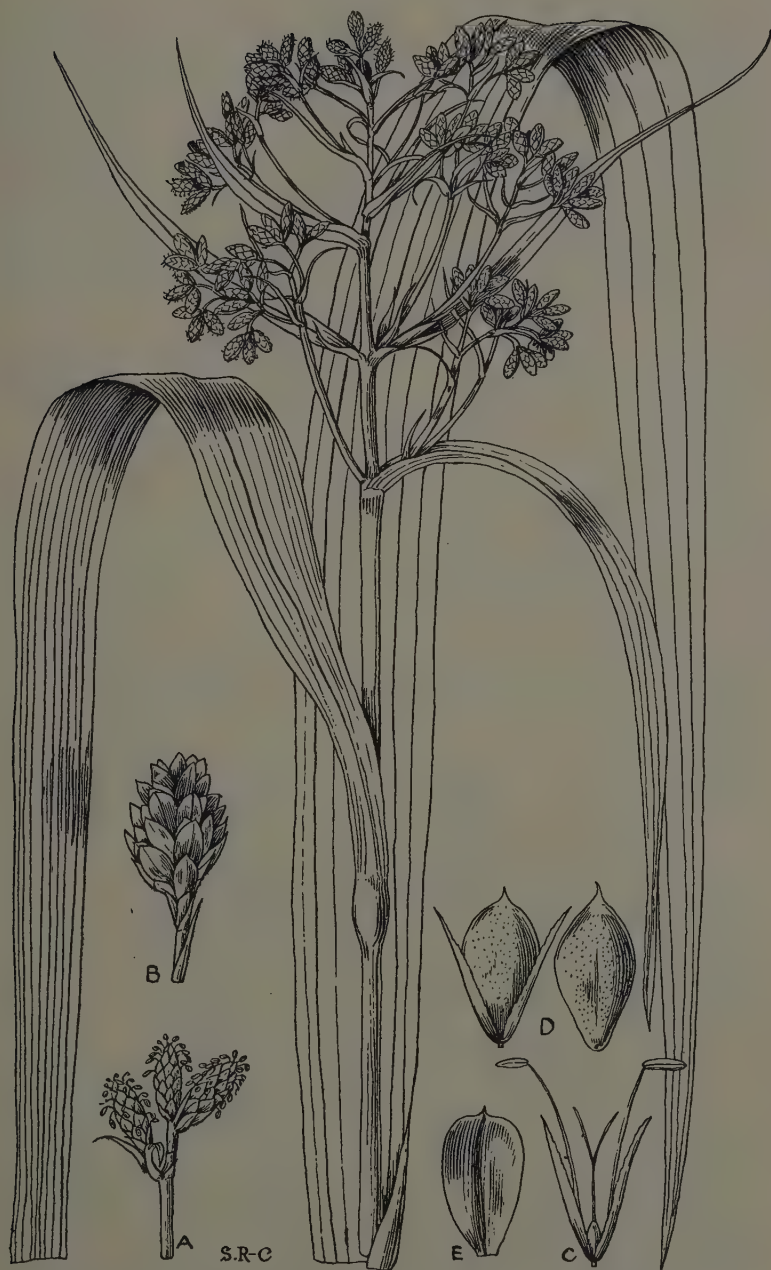
5. *pusilla*

Axis of spikelet with short persistent bristles within the flower; glumes subulate-lanceolate; hypogynous scale long-subulate-acuminate, winged in the upper part, the wings embracing the flower; spikelets 3-5 in a head; plants slender, about 25 cm. high ..

6. *setigera*

1. *Ascolepis brasiliensis* C.B.Cl.—F.T.A. 8: 478. Stems slender, up to 2 ft. high, ribbed; glumes and scales pale brown straw-coloured.

French Guinea: Erimakuna, in wet alluvial mud (Mar.)! N. Nigeria: Nupe, in swamps! Also in East Tropical South America, Bolivia, and Madagascar. Exsicc.—*Sc. Elliot* 5243. *Barter* 1587.

FIG. 344.—*HYPOLYTRUM HETEROPHYLLUM* Boeck. (CYPERACEAE).

A, male spikelets. B, female spikelets. C, male flower D, nutlets. E, glume.

2. *A. protea Welw.*—F.T.A. 8: 474; excl. vars. Heads very small.
French Guinea: Futa-Jallon! Sierra Leone: Lengekora, 1,200 ft., in shallow soil on granite outcrop (July)! Ivory Coast: Mt. Dourou, 3,500 ft.! Mankono Circle! N. Nigeria: Liruwen-Kano Hills! Sokoto Prov.! on plains (Aug.)! Also in Angola. Exsicc.—Pobéguin. Glanville 220. Carpenter. Dalz. 573. Lely P. 473. Chev. 18466; 18800; 21729; 21884.
3. *A. elata Welw.*—F.T.A. 8: 476. *A. protea* var. *bellidiflora* C.B.Cl. in F.T.A. 8: 475, partly (excl. Welw. specimens). *A. protea* var. *splendida* K. Schum. A herb up to 1 ft. high with snow-white heads resembling those of a double daisy.
N. Nigeria: Kibba country, Yola Prov. (Aug.)! Abinsi (Sept.)! Ibi, Muri Prov. (July)! Panyam, 4,500 ft. (July)! Generally distributed in Tropical Africa. Exsicc.—Dalz. 238; 813. Hepburn 30. Lely 411; P. 480.
4. *A. capensis Ridley*—F.T.A. 8: 477; Chev. Bot. 706, partly.
French Sudan! Ivory Coast: near Dotou! N. Nigeria: Kabba Road (Oct.)! Nupe! Abinsi, in wet pastures (Sept.)! Extends to Eastern Sudan through East Africa to South Tropical and South Africa. Exsicc.—Parsons 24. Barter. Dalz. 814. Chev. 686; 21700 bis.
5. *A. pusilla Ridley* in Trans. Linn. Soc. Ser. 2, Bot. 2: 164, t. 23, figs. 10-14.—F.T.A. 8: 476.
N. Nigeria: Nupe, in rice fields! Kabba Road, fairly frequent in moist places (Oct.)! Also in Angola and Rhodesia. Exsicc.—Barter 761 (partly). Parsons 32.
6. *A. setigera Hutch.* in Kew Bull. 1936: ined. *A. gracilis* Turill, partly (as to Barter 761, partly). Very similar to the preceding, but taller and with bristle-like spikelets; axis of spikelets with persistent bristles.
N. Nigeria: Nupe, in rice fields! Bauchi Plateau (Aug.)! Exsicc.—Barter 761 (partly). Lely P. 471.

9. FIMBRISTYLIS Vahl—F.T.A. 8: 411.

Stem bearing only 1 spikelet; glumes chaffy, with broad thin margins, glabrous, subdistichous; spikelet about 1 cm. long; leaves about half as long as the stem; nut trigonous, pale, slightly tuberculate 1. *monostachya*

Stem bearing several to many spikelets:

Leaves and stems glabrous (leaf-margins sometimes minutely scabrid):

Spikelets 1 cm. long or more at flowering time:

Glumes gradually acuminate, triangular-ovate, glabrous:

Spikelets about 3-4 to each stem, the middle one sessile, the others long-stalked; glumes subdistichous, straw-coloured; nut at length black 2. *triflora*

Spikelets numerous in a panicle; bracts of the lowest umbel about 3 cm. long; glumes spirally arranged, brown, with narrow hyaline margins; nut nearly black, finely pitted in vertical rows 3. *nigritana*

Glumes rounded and mucronate at the apex:

Glumes densely puberulous in the upper third in the middle, keeled towards the apex; leaves very short, with thin brown truncate basal sheaths; nut pale, almost smooth 4. *ferruginea*

Glumes glabrous 6. *dichotoma*

Spikelets up to about 6 mm. long at flowering time:

Spikelets glomerate and subsessile on the branches of the inflorescence; leaves and stems rigid, the former triangular at the apex and with scabrid margins; bract as long as the inflorescence; glumes keeled; nut trigonous, dark coloured 5. *obtusifolia*

Spikelets pedunculate in the inflorescence:

Nut longitudinally ribbed, the cells distinct and superposed; spikelets variable in size, up to 6 mm. long, longer in fruit; glumes brown, rounded, ovate and slightly mucronate; leaf-sheaths more or less pubescent:

Stem-base without the remains of leaves 6. *dichotoma*

Stem-base with numerous fibrous remains of leaf-bases 7. *Chevalieri*

Nut muricate or transversely barred, not longitudinally ribbed:

Base of stem clothed with numerous fibrously split leaf-bases; spikelets rather narrow and acute, about 6 mm. long:

Glumes with a thick prominent keel and hyaline margin, very acutely acuminate; nut pale 8. *scabrata*

Glumes with a 3-nerved keel, at most mucronate; nut not seen 7. *Chevalieri*

Base of stem without fibrous leaf-bases:

Spikelets about 7 to the umbel, 5 mm. long; glumes few to each spikelet, sharply acuminate, strongly keeled; nut pale, rounded-trigonous 9. *tenera*

Spikelets numerous to the umbel:

Spikelets in a lax inflorescence; lower glumes soon falling off, not apiculate; nut with fine transverse bars 10. *millicacea*

Spikelets in a rather crowded inflorescence; glumes minutely mucronate, brown; nut as in preceding 11. *quinguanularis*

Leaves and stems, or leaves only, pubescent or pilose or setulose on the margin; spikelets numerous:

Style-base with a ring of pendant hairs; lower glumes with shortly pubescent acuminate tips, 3-nerved; spikelets about 5 mm. long; bracts pubescent; nut small, biconvex, smooth 12. *squarrosa*

Style-base without pendant hairs:

Style-branches 2; style pubescent except at the base:

Spikelets numerous and crowded, narrow, about 6 mm. long; glume triangular, markedly keeled and apiculate; nut apparently ribbed by the vertical rows of cells 13. *bis-umbellata*



FIG. 345.—*FIMBRISTYLIS FERRUGINEA* Vahl (CYPERACEAE).

A, involucre of bracts. B, part of rachis. C, vertical section of flower. D, glumes.
E, flower in young fruit.

Spikelets narrowly ovate, not crowded; glumes ovate-rounded, mucronate, dark brown 6. *dichotoma*

Style-branches 3:

Glumes shortly pubescent, stramineous, markedly keeled and acuminate; bracts often much overtopping the spikelets; nut with transverse wavy lines

14. *cioniana*

Glumes at most puberulous, dark purple, markedly keeled and acuminate; leaves often quite filiform, finely pilose; nut sharply angular, pale, with faint transverse lines 15. *exilis*

1. *Fimbristylis monostachya* Hassk.—F.T.A. 8: 424; Chev. Bot. 703.
Ivory Coast: various locs. N. Nigeria: Ringim Mukr, 2,500 ft. (May)! Zaria (July)! Widely distributed in all warm regions. Exsicc.—Lely 221. Taylor 23.
2. *F. triflora* K. Schum. in Engl. Pf. Ost-Afr. G. 124. *Cyperus triflorus* Linn. *F. tristachya* Thwaites—F.T.A. 8: 424. Rootstock rather thick; leaves thick, half as long as the flowering stems.
Gold Coast: Accra (Mar.)! Togo: near Lome! Also in Zanzibar, Mozambique, South India and Ceylon. Exsicc.—Johnson 1043. Warncke 140.
3. *F. nigritana* C.B.Cl.—F.T.A. 8: 418; Chev. Bot. 704.
French Sudan: Zambora! N. Nigeria: Nupe! Exsicc.—Barter 623.
4. *F. ferruginea* Vahl—F.T.A. 8: 417; Stapf 664.
Senegal: Salum R.! Liberia: Grand Bassa (July)! S. Nigeria: Nun R. (Sept.)! Widely distributed in warmer regions, often near the coast. Exsicc.—Brunner 150. Vogel 36; 55. Dawodu 343.
5. *F. obtusifolia* Kunth—F.T.A. 8: 423; Chev. Bot. 704; Stapf 664. *Isolepis obtusifolia* Beauv. Fl. Owar. 2: 88, t. 81, fig. 1. Leaves very thick and stiff, with minutely scabrid margins.
Senegal! Sierra Leone: Yele, Turtle Islands (Nov.)! King Tom, on bare rocks by the sea (Oct.)! Liberia: Grand Bassa! Ivory Coast: Tabou, seashore (Aug.). Togo: near Lome! S. Nigeria: banks of Nun R. (Sept.)! Lagos Island! African coast generally, Mascarenes, Tropical America. Exsicc.—Roger. Deighton 2157; 2307. Vogel 34; 70. Warncke 130. Dalz. 1110. Mann 532.
6. *F. dichotoma* Vahl Enum. Pl. 2: 287 (1806). *F. diphylla* Vahl—F.T.A. 8: 415; Chev. Bot. 703; Stapf 663.
A rather variable species as to size of spikelet.
French Sudan and Senegal to S. Nigeria and Fernando Po, widely spread throughout the warmer parts of the world. Exsicc.—Chev. 784. Pobéguin 414; 419. Mann 892. Chev. 22369. Deighton 1294; 1353; 1381; 2041. Glanville 133. Warncke 128. Sc. Elliot 3917; 5355. Beal 24. Barter 131; 1581. Dalz. 261; 473; 818. Lely 153; P. 451; P. 452. Schlechter 12346. Vogel 12. Holland 275. Migeod 261. Saunders 17; 50. Irvine 718; 738. (See Appendix).
7. *F. Chevalieri* Kükenthal in Bull. Mus. Hist. Nat. Paris 1931: 547. Stem bases densely covered with the fibrous remains of the leaf-sheaths.
French Guinea: Siguiri Circle, between Dioumabana and Siguiri (May)! Exsicc.—Chev. 25897.
8. *F. scabrida* Schumacher—F.T.A. 8: 422.
Gold Coast: Accra (Mar.)! Achimota (May)! Ejura, N. Ashanti (Apr.)! N. Nigeria: Nupe! S. Nigeria: Wasmil Road (May)! Also in the N.E. Congo. Exsicc.—Johnson 1019. Williams 234. Barter 1578; 1582. Irvine 1622.
9. *F. tenera* Roem. & Schultes—F.T.A. 8: 420.
Gold Coast: Accra! Exsicc.—Don.
10. *F. miliacea* Vahl—F.T.A. 8: 421.
Senegal! Rare in Africa, but common in other warm regions. Exsicc.—Heudelot 212.
11. *F. quinqueangularis* Kunth—F.T.A. 8: 421. About 2 ft.; stems strongly ribbed.
Sierra Leone: Falaba (Mar.)! Near Sahn (Apr.)! Widely distributed. Exsicc.—Sc. Elliot 5166. Deighton 1686.
12. *F. squarrosa* Vahl—F.T.A. 8: 413.
French Sudan: Between Djenné and Soufara (July)! N. Nigeria: Nupe, sand-banks of the river! In bed of Benue R., Abinsi distr. (May)! Widely distributed. Exsicc.—Barter 1580. Dalz. 822. Chev. 1149.
13. *F. bis-umbellata* Dub. Decadentha 30 (1850). *Scirpus bis-umbellatus* Forsk. *F. dichotoma* Vahl, partly.—F.T.A. 8: 414; Chev. Bot. 702.
French Sudan: Djenné (June)! N. Nigeria: Nupe, sand-banks of the Niger R.! Sokoto (July)! Warmer regions of the Old World and Australia. Exsicc.—Chev. 1119. Barter 1209. Dalz. 461. Moiser.
14. *F. cioniana* P. Savi—F.T.A. 8: 420; Chev. Bot. 702.
French Sudan: San, on the banks of the Bani R. (June)! Laminaiya (Apr.)! N. Nigeria: Nupe, sand-banks of R. Niger! S. Nigeria: Aboh! Also in Eastern Sudan and Congo. Exsicc.—Chev. 1087. Barter 127; 132; 1211. Thomas 141. Deighton 1658; 1703. (See Appendix).
15. *F. exilis* Roem. & Schult.—F.T.A. 8: 418; Chev. Bot. 703; Stapf 664.
Senegal to N. and S. Nigeria; widely distributed in Tropical Africa, S. Africa, Mascarene Islands and in Tropical America. Exsicc.—Sieber 4. Heudelot 390. Roger 114. Dawe 551. Deighton 285; 939; 2011; 2302. Fisher 26. Sc. Elliot 5181. Warncke 121; 196. Barter 356; 1576. Parsons 84. Dalz. 243; 282; 456; 1107. Moiser 132. Dent Young 260. Lely P. 453; P. 455; P. 490; 675. Golding 17. Vogel 91. Mann 778. Millen 105. Pobéguin 406; 411. (See Appendix).
16. *F. Schweinfurthiana* Boeck.—F.T.A. 8: 421; Chev. Bot. 704.
This was recorded by Clarke and Chevalier from Senegal and the French Sudan. I have not seen the Senegal specimen, but Chevalier's plant is not *F. Schweinfurthiana*, but is too young for determination.
Imperfectly known species.

- F. Thonningiana* Boeck.—F.T.A. 8: 426.
Gold Coast: without locality. Exsicc.—Thonning.

10. BULBOSTYLIS Kunth—F.T.A. 8: 427.

Head of spikelets or spikelet on each stem:

Nut smooth between the angles:

Small annuals with filiform leaves and flowering stems; leaf-sheaths membranous and long-pilose; glumes with acuminate recurved tips, sharply keeled; nut whitish 1. *barbata*

Perennials:

Bracts setaceous, longer than the head; leaves filiform; heads about 1 cm. diam.; glumes pale brown, finely scabrid-puberulous; nut brown 2. *laniceps*

Bracts broadly lanceolate, shorter than the head; spikelets very crowded; glumes dark brown; nut pale 3. *cardiocalpa*

Nut transversely ribbed or wavy between the angles :

Flowering stem with only 1 spikelet; spikelet 1 cm. long; glumes dark brown, with a 3-nerved keel; bracts setaceous, a little longer than the spikelet; leaves very short, with a broad ribbed sheath; nut obovoid, pale . . . 4. *Clarkeana*

Flowering stem with more than 1 spikelet in a head :

Spikelets very short and ovoid, the glumes broadly ovate, brown or brownish-purple; stems shortly pubescent; bracts setaceous from a broader base

5. *filamentosa*

Spikelets lanceolate, the glumes broadly lanceolate, purple-brown :

Leaf-sheaths glabrous outside, not ciliate in the throat; bracts rigid, gradually narrowed into the lanceolate base, several nerved . . . 6. *erratica*

Leaf-sheaths shortly pubescent outside, long-ciliate in the throat; base of bracts triangular . . . 7. *aphyllanthoides*

Head of spikelets several and more or less umbellate on each stem :

Spikelets separate and laxly arranged on very slender peduncles; leaf-sheaths often with long fine hairs inside :

Glumes more or less distinctly 3-nerved-keeled on the back; spikelets rather narrow; Leaves and inflorescence glabrous; spikelets very few to each stem, about 8 mm. long; nut minutely verrucose . . . 8. *trichobasis*

Leaves and inflorescence more or less pilose; spikelets very numerous to each stem, less than 5 mm. long; nut transversely wrinkled . . . 9. *abortiva*

Glumes 1-nerved-keeled on the back; spikelets rather fat and comparatively short with very broad glumes . . . 10. *coleotricha*

Spikelets more or less crowded on rather short peduncles :

Stems glabrous; leaves and stems capillary, subequal in length; spikelets few and very small; nut pale, smooth . . . 11. *capillaris*

Stems pubescent towards the top; leaves much shorter than the flowering stems; bracts setose from a lanceolate base, scabrid; spikelets forming a small cyme; glumes dark brown-purple, prominently keeled; nut pale, transversely ribbed

12. *puberula*

1. *Bulbostylis barbata* Kunth—F.T.A. 8: 431; Chev. Bot. 701; Stapf 664. *B. fimbriatylloides* K. Schum. ex A. Chev. Bot. 702. *B. Buchanani* A. Chev. Bot. 701, not of C.B.Cl. Tufted, up to 1 ft. high; bracts 2, setaceous, one much longer than the other.

Senegal to Nigeria, and in other parts of Tropical Africa, and in the Eastern tropics to Australia. Exsicc.—*Heudelot* 441. *Deighton* 581. *Baumann* 538. *Vogel* 161. *Dalz.* 458; 1108. *Irvine* 740; 1626. *Warncke* 122. *Chev.* 2453; 20065 bis; 23492. *Fleury in Herb. Chev.* 22098. *Barter* 159; 840. (See Appendix.)

2. *B. laniceps* C.B.Cl.—F.T.A. 8: 433; Chev. Bot. 702; Stapf 664. *Fimbristylis aurocensis* A. Chev. Bot. 702. Densely tufted, heads globose, brown, nearly $\frac{1}{2}$ in. diam.; bracts several, filiform.

French Guinea: Beyla (Mar.)! Sierra Leone: between Yoni and Ngepe, Bonthe Island (Nov.)! Sendugu (June)! Mapema (Feb.)! Liberia: Grand Bassa! Ivory Coast: Baoulé Nord! Gold Coast: Accra (July)! Achimota (June)! Dahomey: Atacora Mts.! Extends to the Congo. Exsicc.—*Deighton* 2239. *Thomas* 557. *Glanville* 159. *Vogel* 92 (partly). *Irvine* 707; 1623. *Chev.* 22343; 24140. *Dalz.* 174.

3. *B. cardiocarpa* C.B.Cl.—F.T.A. 8: 434. Flowering stems elongated; leaf-sheaths purplish, pubescent; heads broadly ovoid.

French Guinea: Timbo (Oct.)! Sierra Leone: Rowala (July)! Mabonto-Bunbuna (Aug.)! Extends to Angola. Exsicc.—*Morson. Thomas* 1112. *Deighton* 1400. *Pobéguin* 1885.

4. *B. Clarkeana* Hutch. in Kew Bull. 1936: ined. *B. festuoides* C.B.Cl., F.T.A. 8: 430, not of Kunth.

French Guinea: on wet mud at Erimakuna (Mar.)! Exsicc.—*Sc. Elliot* 5244.

5. *B. filamentosa* Kunth—F.T.A. 8: 433; Chev. Bot. 701. Densely tufted, 1–1 $\frac{1}{2}$ ft. high.

French Sudan: Mossi! French Guinea: Kouroussa (July)! Sierra Leone: Kabusa (Apr.)! Ivory Coast: Kodiokoffi distr. (Aug.)! N. Nigeria: Nupe! Abinsi (Oct.)! Lokoja distr.! Bauchi Plateau. Extends to the Eastern Sudan and the Transvaal. Exsicc.—*Pobéguin* 424. *Sc. Elliot* 5467. *Chev.* 22364. *Barter* 1577. *Dalz.* 823. *Richardson, Lely* P. 463.

Var. *? barbata* C.B.Cl.—F.T.A. 8: 433. Heads larger than in the type; glumes with long white hairs on the margins!

6. *B. erratica* C.B.Cl.—F.T.A. 8: 434. Densely tufted; flowering stems few, sometimes shorter than the leaves.

Cameroons Mt.: 7,000–11,000 ft. (Nov.–Jan.)! Fernando Po: 8,000–9,000 ft. Exsicc.—*Mann* 635; 1344; 1472; 2105. *Johnston* 41. *Maitland* 638; 876; 1268. *Migeod* 177. *Mildbr.* 10893. *Preuss* 925.

7. *B. aphyllanthoides* C.B.Cl.—F.T.A. 8: 436. *Fimbristylis aphyllanthoides* Ridley. *F. africana* Dur. & Schinz.—F.T.A. 8: 425; Chev. Bot. 702. Almost $\frac{1}{2}$ ft. high, tufted, in open savannah.

Ivory Coast: Kodiokoffi distr. (Aug.)! Gold Coast: Accra (Mar.)! Togo: near Lomé! N. Nigeria: Nupe! S. Nigeria: Lagos! Oloke Meji (Apr.)! Also in E. Africa and in Angola. Exsicc.—*Chev.* 22361. *Deighton* 599. *A. S. Thomas* 163. *Brown* 406. *Farnar* 521. *Warncke* 124; 125. *Barter* 491; 1762. *Irvine* 1628; 1639. *Dalz.* 1116; 1433. *MacGregor* 286. *Johnson* 726. *Schlechter* 12967.

8. *B. trichobasis* C.B.Cl.—F.T.A. 8: 445. *Fimbristylis komiankensis* A. Chev. Bot. 703, name only.

French Guinea: Komianke's country, between Kesseridou and Oussoudou (Feb.)! S. Nigeria: Bamenda, 5,000 ft. (Jan.)! Also in East Africa and Nyasaland and in Madagascar. Exsicc.—*Chev.* 20836. *Migeod* 318.

9. *B. abortiva* C.B.Cl.—F.T.A. 8: 441; Chev. Bot. 700. Tufted, with capillary leaves and panicles of narrowly elliptic brown spikelets.

French Sudan: Koulikoro (Oct.)! Sierra Leone: Lengekoro, 1,200 ft. (July)! Ivory Coast: Sassandra Valley (June)! Togo: N. Nigeria: Nupe! Bauchi Plateau! General in Tropical Africa and in Madagascar. Exsicc.—*Büttner* 123. *Barter* 413. *Chev.* 21829. *Glanville* 219. *Lely* P. 468.

10. *B. coleotricha* C.B.Cl.—F.T.A. 8: 442, incl. var. *lanifera* C.B.Cl. Stems and leaves almost capillary, densely tufted, up to about 1 ft.; glumes brown.

French Sudan: Koulikoro (Oct.)! French Guinea: Kouroussa (July)! Sierra Leone: Binkolo, on granite outcrop (Aug.)! Gold Coast: Aburi! N. Nigeria: Nupe! Sokoto! Yola (July)! Bauchi Plateau! S. Nigeria: Yoruba country! Calabar (Feb.)! Widely spread in Tropical Africa. Exsicc.—*Chev.* 2476. *Pobéguin* 418. *Deighton* 1279. *Anderson* 52. *Barter* 339; 357; 531; 550; 1030. *Dalz.* 259; 457. *Lely* P. 474. *Schlechter* 12347. *Mann* 2331.

11. *B. capillaris* Kunth—F.T.A. 8: 438, incl. var. *trifida* C.B.Cl. Like the last but dwarfer, with very dark brown glumes.

- Sierra Leone: Pendembu (July)! Leicester (Aug.)! Batkanu (Feb.)! Togo! N. Nigeria: Nupe! Bauchi Plateau (Aug.)! S. Nigeria: Bamenda, 4,000 ft. (June)! Cameroons Mt.: 6,000-10,000 ft. 1 Fernando Po: 8,500 ft. (Dec.-Jan.)! Common in all warm regions of the world. Exsicc.—Thomas 775. Deighton 2046. Glanville 160. Baumann. Barter 1579. Lely P. 472. Maitland 875; 1759. Mann 660; 1360; 1471; 2093. Steele 76. Migeod 205.
12. *B. puberula* Kunth—F.T.A. 8: 439. Small and very like a *Luzula*. Cameroons Mt.: 9,000 ft.! Extends to Mascarene Islands, India and Malaya. Exsicc.—Mann 1360 partly; 2093, partly.

11. REMIREA Aubl.—F.T.A. 8: 485.

Rhizome elongated, creeping; stems short, densely leafy, leaf-bases persistent; leaves linear, gradually narrowed to the obliquely acute apex, up to 7 cm. long, minutely scabrid on the margin; spikes ovoid, about 1.5 cm. long, sessile or shortly pedunculate and surrounded by broader based leaf-like bracts; glumes with a hard keeled tip, distinctly nerved; nut narrowly ellipsoid, straw-coloured *maritima*

- R. maritima* Aubl. Pl. Guian. 1: 45, t. 16; Beauv. Fl. Owar. 2: 23, t. 73.—F.T.A. 8: 486; Chev. Bot. 708. A small scrubby maritime plant up to 1 ft. high; leaves tough.

Sierra Leone: various locs.! Liberia: Monrovia, in sand of upper beach (Nov.)! Ivory Coast: various locs.! Gold Coast: Axim, on the beach (Dec.)! near Teshi (Nov.)! Dahomey: Cotonou (Apr.)! S. Nigeria: common on Victoria beach, Lagos (Aug.)! Sandy banks of the Nun River (Sept.)! Widely spread on tropical coasts. Exsicc.—Don. Thomas 7296. Deighton 2021. Linder 1436. Johnson 968. Irvine 801. Chev. 23474. Dalz. 1014. Mann 534. (See Appendix).

12. CYPERUS Linn.—F.T.A. 8: 310.

By E. A. BRUCE

*Spikelets clustered into a single, unbranched head:

Leaves reduced to a sheath and subulate point; involucre of 1 or 2 short, subulate bracts, not or scarcely longer than the head; spikelets compressed, glumes 3-nerved, much imbricated 1. *nudicaulis*

Leaves normally developed; involucre of bracts definitely longer than the head:

Glumes not striate, narrow in comparison with their length, scarcely imbricate, not apiculate; spikelets small; involucre bracts 3, somewhat reflexed; leaves linear, shorter than the stem 2. *leucocephalus*

Glumes striate, spikelets usually large:

Glumes not apiculate:

Glumes comparatively narrow in relation to their length; head 2-2.5 cm. in diameter, bracts generally 4, linear; leaves not filiform, 4-8, about half the length of the stem 3. *obtusiflorus*

Glumes comparatively broad in relation to their length:

Spikelets almost as broad as long; leaves and bracts filiform; heads about 1.5 cm. diameter, involucre bracts generally 4, about 3 cm. long

3. *obtusiflorus* var. *tenerior*

Spikelets much longer than broad; leaves not filiform:

Spikelets compressed, about 8 mm. broad; heads 2-4 cm. diameter; perennial, thickened at the base with leaf-sheaths 4. *margaritaceus*

Spikelets compressed, at most 3 mm. broad; heads less than 2 cm. diameter; perennial, covered at the base with black fibres 5. *clavimix*

Spikelets hardly compressed, about 4-5 mm. broad 9. *maritimus*

Glumes apiculate:

Apex of glume not recurved; perennials:

Leaves and bracts subulate or filiform; spikelets shining, pale with about 15 glumes on each side of the rhachilla 6. *Aucheri*

Leaves and bracts not subulate, about 1 mm. broad; spikelets dull greenish with less than 15 glumes on each side of the rhachilla 16. *compressus*

Leaves and bracts broadly linear:

Leaves and bracts 7-10 mm. broad, flat; head about 3 cm. diam.; stem winged

7. *dichromeniformis* var. *major*

Leaves about 4 mm. broad, thick and rigid, with a spiny point, glaucous; head 2 cm. diam.; bracts unequal, 2-3 times as long as the head; glumes pinkish

11. *angolensis*

Apex of the glume recurved; small annuals 12. *uncinatus*

**Spikelets not in a single unbranched head:

†Spikelets digitate (all arising from about the same point):

Leaves and involucre bracts broad and flat, not distinguishable from each other, linear-lanceolate; up to 12 cm. long and 2 cm. broad, with 3 primary nerves; umbel simple of long rays, up to 30 cm.; spikelets 2 or 3, digitate, much longer than the subtending bracts 8. *fertilis*

Leaves and involucre bracts not as above:

Umbel contracted into a compound head:

Heads very dense, subglobose, 4-6 cm. diameter; spikelets stout, not compressed; stem thick, leaves and bracts leathery, generally folded; rhizome thick and woody, covered with brown leaf-bases 9. *maritimus*

Heads lax ; spikelets and stem slender, leaves and bracts not leathery :

Glumes several-striate, closely imbricate, 12 or more each side of the rhachilla ; spikelets pale brown radiating in all directions ; involucre bracts narrow, linear, overtopping the rays 10. *effusus*

Glumes 3-nerved with a green keeled midrib, about 6 on each side of the rhachilla, dark purple ; leaves much shorter than the stem 22. *tenax*

Umbel not contracted into a compound head :

Tip of glume recurved :

Recurved tip half as long as glume ; glumes spreading, closely and conspicuously 3-nerved ; rays of umbel short, not more than 3 times the length of the head ; leaves and bracts linear-filiform ; tufted annual with simple umbel or reduced to a single head 12. *uncinatus*

Glume only shortly recurved at the apex ; leaves and bracts flat and flaccid, linear, the latter far overtopping the umbel, up to 20 cm. long ; umbel generally compound 13. *reduncus*

Tip of glume not recurved :

Roots woolly (probably a fungoid growth) ; perennials with a simple umbel and spikelets generally conglomerated into dense heads :

Spikelets about 1 cm. long (up to 8 glumes on each side of the rhachilla) straw-coloured or pale brown :

Few spikelets in a head (up to 12) straw-coloured ; umbel of 5-8 rays about 4 cm. long ; leaves and bracts leathery, overtopping the umbel 14. *cruentus*

Many spikelets in a head (about 20) pale brown ; spikelets stout, not compressed ; heads about 2.5 cm. diameter ; rhizome woody and covered with brown leaf-sheaths 15. *conglomeratus*

Spikelets from 1.5-3 cm. long (12-15 glumes on each side of the rhachilla) :

Spikelets shining, pale, about 3 cm. long (up to 15 glumes on each side of the rhachilla) ; leaves and bracts subulate or filiform 6. *Aucheri*

Spikelets many together, dull, pale brown or chestnut, about 1.5 cm. long (up to 12 glumes on each side of the rhachilla) ; leaves and bracts not subulate or filiform 10. *effusus*

Roots not woolly, usually slender ; umbel simple or compound ; spikelets generally compressed and not conglomerated into dense heads :

† Involucre of narrow leafy bracts, at most 5 mm. broad (sometimes broader in *C. difformis*) :

Glumes with several striations ; annuals :

Glumes apiculate ; spikelets compressed, comparatively broad, and generally more than 3 in a cluster at the end of each ray ; leaves and bracts linear 16. *compressus*

Glumes not apiculate ; spikelets narrow, about 3 in a cluster at the end of each ray ; umbel simple of 4-7 rays, bracts 3-5, about 3 mm. wide, overtopping the umbel 46. *sphacelatus* var. *tenuior*

Glumes not more than 3-nerved ; annuals or perennials :

Spikelets few (up to 6 together) :

Annuals with spreading compound umbel ; spikelets narrow, about 1 cm. long, basal glumes early deciduous ; nut tuberculate ; stem trigonous ; bracts foliaceous 17. *tenuispica*

Perennials :

Plants with a compound umbel, narrowly winged stem and smooth nut :

Bracts more than 2 cm. long, foliaceous, generally as long as the rays ; spikelets linear-lanceolate, glumes 3-nerved ; leaves linear, shorter than the stem 18. *Haspan*

Bracts rigid-subulate, up to 2 cm. long, much shorter than the rays ; leaves often much reduced 19. *denudatus*

Umbel simple, sometimes reduced to a single head ; small plant (7 cm. high) with flaccid leaves ; nut blackish 20. *Adansonii*

Spikelets numerous (more than 6 together) :

Spikelets brown or chestnut ; glumes not early deciduous, definitely longer than broad ; bracts subulate :

Annual with spreading umbel of slender rays ; spikelets linear, about 1 mm. broad, glumes 3-nerved with a conspicuous green midrib ; leaves and bracts narrowly linear ; roots slender, fibrous 21. *amabilis*

Tufted perennial with a short rhizome ; umbel congested, bracts linear, filiform, generally 4, overtopping the umbel ; leaves several to a stem less than half its length 22. *tenax*

Spikelets pale coloured ; glumes early deciduous, almost as long as broad ; bracts flat, linear :

Stem winged ; spikelets densely conglomerated, glumes very small, almost as broad as long, broadly rounded at the apex 23. *difformis*

- Stem angular; glumes definitely longer than broad, narrowed to the apex;
leaves and bracts narrower, about 2 mm. broad .. 24. *microlepis*
- †† Involucral bracts and leaves broad and flat (more than 5 mm. broad); umbel
of several compound rays:
- Nut equal to or longer than the glume; glumes just over 1 mm. long, striate,
spreading from the rhachilla and slightly recurved at the tip; involucral
bracts 6-8, 6-14 mm. broad with 3 main nerves .. 25. *diffusus*
- Nut conspicuously shorter than the glume:
- Spikelets few- (3-6) flowered, glumes striate recurved at the tip just under
2 mm. long; umbel with 7-10 compound rays, lax and spreading; bracts
1-2.5 cm. broad and up to 60 cm. long .. 26. *Renschii*
- Spikelets several- (8-12) flowered, lanceolate, about 5 mm. long; glumes just
over 2 mm. long not definitely recurved at the tip; bracts 6-15 mm. broad
27. *Mannii*
- †† Spikelets spicate (arising from different points):
- Leaves present or at the base of the flowering stems:
- Glumes recurved at the apex, several-striate, spreading from the rhachilla; spikelets
crowded, densely spicate; umbel simple, sometimes reduced to a single head;
tufted annual with linear leaves, at most 4 mm. wide .. 28. *aristatus*
- Glumes not recurved at the apex:
- Glumes broadly rounded at the apex and not apiculate, or only very slightly so:
- Rhachis of inflorescence glabrous; glumes without a white membranous margin:
- Glumes distant, 3-nerved, yellow, small (less than 2 mm. long), rhachilla slender,
flexuous; spikelets loosely spicate; leaves and bracts linear, 2-4 mm. broad;
umbel compound .. 29. *Iria*
- Glumes approximate, several-striate (2-3 mm. long), distinctly imbricate,
rhachilla stout, not flexuous; rays of umbel unequal, longest from 12-20 cm.
30. *incompressus*
- Rhachis of inflorescence shortly pubescent; glumes approximate with a white
membranous margin; spikelets about 1.5 cm. long .. 31. *procerus*
- Glumes usually narrowed to the apex and acute or apiculate:
- Spikelets comparatively short (at most 7 mm.) and very numerous, arranged in
narrow spikes not more than 1.2 cm. wide:
- Spikelets very densely spicate and overlapping, sometimes contracted into a head:
- Glumes long-apiculate at the apex, apiculus slightly recurved; spikes usually all
sessile; spikelets about 4 mm. long; involucral bracts about 6 mm. broad,
scabrid on the margin near the base .. 32. *imbricatus*
- Glumes shortly apiculate, apiculus not recurved, some of the spikes peduncled
34. *dives*
- Spikelets not overlapping and not so densely spicate as above; some spikes
peduncled:
- Spikelets narrow (about 1 mm. broad), not flattened; glumes 3-5-nerved on
the keel; umbel 9-15 cm. long; bracts 2 or 3 foliaceous, 20-40 cm. long
33. *auricomus*
- Spikelets broader (about 2 mm.), flattened, or spreading at right angles to the
axis or slightly ascending; glumes with a single nerve, shortly apiculate;
involucral bracts about 3, 8-14 mm. broad and up to 50 cm. long 34. *dives*
- Spikelets comparatively long (1 cm. or more) and arranged in correspondingly
broad spikes:
- Spikelets 3-4 to each ray of the umbel; a slender annual with a simple umbel
of 4-6 rays about 4 cm. long; leaves and bracts linear, flaccid
46. *sphacelatus* var. *tenuior*
- Spikelets more than 4 to each ray of the umbel:
- Spikelets blackish-purple with a greenish keel; glumes distant on the rhachilla;
spikes sessile, clustered in a loose head about 3 cm. diameter; involucral
bracts 2, linear, up to 8 cm. long .. 35. *atroviridis*
- Spikelets pale green or reddish-brown:
- Spikelets with distant glumes, only slightly overlapping one another in the
same row, slender and narrow:
- Spikelets narrowly linear (about 1 mm. broad):
- Glumes with a 3-nerved green keel, about 3 times as long as broad, subacute
at the apex .. 37. *distans*
- Glumes several-striate, spikelets narrow, acute, about 1.5 cm. long, closely
spicate and spreading at right angles to the rhachis; bracts generally 5,
subequal to the umbel .. 38. *callistus*
- Spikelets linear (about 2 mm. broad); glumes ovate, acute, more than
3-nerved .. 44. *Zollingeri*
- Spikelets with the glumes at least half overlapping each other in the same
row, stouter:
- Spikes few (about 3) and very congested, not or scarcely stalked, about 2 cm.

long; glumes several-striate, reddish-brown; leaves and bracts linear-filiform, generally overtopping the spikes:

Stolons very slender, disappearing as soon as the bulbs are completely formed; rhachilla winged 39. *bulbosus*

Stolons hardening into a rhizome; rhachilla not winged 36. *Heudelotii*
Spikes more numerous and some at any rate pedunculate:

Spikelets elongated, about 5 cm. long, very numerous and crowded, up to 25 glumes on each side, often purple-spotted 40. *locuples*

Spikelets much shorter than above:

Glumes diverging from the rhachilla at an angle of 30°–45° (i.e. more or less spreading):

Spikelets loosely spicate, not congested, about 1.2 cm. long; glumes reddish-brown, about 5-nerved on the keel; leaves and bracts long (latter up to 30 cm.) 41. *Fenzlianus*

Spikelets densely spicate, congested; glumes yellowish or straw-coloured, about 1 mm. long 42. *Baikiei*

Glumes more or less erect and subparallel with the rhachilla (i.e. somewhat closely appressed together):

Angles of the stem (and margins of the bracts) scabrid towards the top; glumes 5–7-nerved, definitely apiculate; spikelets 1.5–3 cm. long; involucre bracts 2–4, not overtopping the umbel .. 43. *Schweinfurthianus*

Angles of the stem smooth:

Glumes distant, only slightly overlapping one another in the same row, ovate, acute, more than 3-nerved; spikelets about 2 mm. broad 44. *Zollingeri*

Glumes imbricate, about half overlapping in the same row:

Glumes tightly imbricate, obscurely 1–3-nerved:

Bracts and leaves narrow, former up to 4 mm. broad; spikelets 1–1.5 cm. long; stem trigonous at the top, not winged 45. *maculatus*

Bracts and leaves broader than above, former 4–10 mm. broad; spikelets slender, 5–14 mm. long, spreading almost at right angles to the axis; stem narrowly winged at the top 33. *auricomus*

Glumes loosely imbricate, distinctly 3–5-nerved:

Glumes (at any rate some) with a purple spot on the margin near the base, obtuse or subacute, strongly 4–6-nerved; bracts 3–6, linear, overtopping the umbel; root tufted 46. *sphacelatus*

Glumes without a spot:

Nerves extending nearly to the margin of the glume, the keel obscure; leaves linear, shorter than the stem, 3–6 mm. broad; bracts 3–5, foliaceous, equal to or longer than the umbel; spikelets yellowish, up to 1.5 cm. long:

Spikelets about 2 mm. broad, obtuse or subacute at the apex 47. *esculentus*

Spikelets about 1 mm. broad, acute at the apex 38. *callistus*

Nerves confined more to the middle of the glume:

Glumes greenish, strongly 5–7-nerved, with a pale margin; spikelets about 12 mm. long and 1.5 mm. broad, up to 12 in loose spikes at the end of the rays; bracts 3–5, about 5 mm. broad, overtopping the umbel 48. *gracilinus*

Glumes brown or reddish with a narrow 3-nerved greenish keel and broad reddish margin; spikelets 1–2 cm. long; bracts unequal, 2–5 equal to or overtopping the umbel 49. *rotundus*

Leaves absent:

Stem articulate, almost round at the top; umbel of unequal rays; spikelets densely and shortly spicate at the end of the rays; involucre bracts reduced to a subulate point about 1 cm. long or less 50. *articulatus*

Stem not articulate; umbel with innumerable, fine, sometimes sterile rays, arising from a truncate encircling sheath 2–3 cm. long; involucre bracts 3–6, lanceolate, about 7 mm. long and 1.5 cm. broad at the base; stem stout trigonous, about 7 mm. diameter at the top 51. *Papyrus*

1. *Cyperus nudicaulis* Poir.—F.T.A. 8: 316; Chev. Bot. 693. An aquatic sedge, common in swamps and on lake margins.

Senegal: Ndanout! N. Nigeria: Nupe! Matyoro (Oct.)! Tropical Africa generally, and in Madagascar and Martinique. Exsicc.—Dollinger. Barter 1568. Thornevill 136.

2. *C. leucocephalus* Retz.—F.T.A. 8: 323; Chev. Bot. 692. A sedge with a spherical head of white spikelets and slender stem, 6–18 in. high, found in damp places.

N. Nigeria: Katagum (May)! Yola (Aug.)! Bauchi Plateau (Aug.)! Angola, India, Malaya, Australia and Tropical America. Exsicc.—Datzel 240; 267. Lely P. 462.

3. *C. obtusiflorus* Vahl Enum. 2: 308. *C. compactus* Lam.—F.T.A. 8: 319; Chev. Bot. 690, not of Retz. A sweet-scented sedge with a spherical white head, 12–18 in. high; in marshes.

N. Nigeria: Niger (April)! Bauchi Plateau (May)! Zaria (July)! Lemme (May)! Tropical and South Africa generally and in the Mascarene Islands. Exsicc.—Baikie. Lely P. 291; 148. Taylor 18.

- Var. *tenerior* E. A. Bruce. *C. compactus* var. *tenerior* C.B.Cl.—F.T.A. 8: 321. A sedge 6–12 in. high with spherical heads and fine leaves.
N. Nigeria: Niger (Apr.)! Agui, near Ilorin! Also in Angola. Exsicc.—Baikie. Thornton.
4. *C. margaritaceus* Vahl.—F.T.A. 8: 321; Chev. Bot. 693. A sedge 6–24 in. high, with a head of spikelets about 1½ in. in diameter, common in sandy soil.
Gambia! Gold Coast: Accra! Togo: Lome! N. Nigeria: Kontagora (June)! Zungeru (Sept.)! Nupe! S. Nigeria: Lagos! Quorra! Also in Tropical Africa generally and in South Africa. Exsicc.—Mackenzie Skues. T. Vogel. Johnson 1015. Warnecke 127. Dalziel 275; 556; 1117. Barter 620. Vogel.
5. *C. clavinox* C.B.Cl.—F.T.A. 8: 319.
N. Nigeria: Bornu. Exsicc.—Vogel 64; 65.
6. *C. Aucheri* Jaub. & Spach. Ill. Fl. Orient. t. 101. *C. conglomeratus* var. *Aucheri* C.B.Cl.—F.T.A. 8: 325. A straw-coloured perennial 6–10 in. high with shining spikelets.
French Sudan: Agadem Oasis (Dec.)! Also in Egypt. Exsicc.—E. Vogel.
7. *C. dichromeniformis* var. *major* Boeck.—F.T.A. 8: 340. *C. major* Cherm. A sedge with a spherical head of spikelets, broad leafy bracts and a winged stem.
Togo. Also in the Nile district, the Congo and Angola. Exsicc.—Duetner 144.
8. *C. fertilis* Boeck.—F.T.A. 8: 341; Chev. Bot. 691; Holl. 763. A sedge with long straggling umbel rays up to 18 in. long, found in damp shady places.
S. Nigeria: Old Calabar River (Feb.)! Oban district! Likomba! Also in Lower Guinea. Exsicc.—Mann 2332. Holland 57. Talbot 2400. Mildbraed 10792.
9. *C. maritimus* Poir.—F.T.A. 8: 326; Chev. Bot. 692. *C. crassipes* Vahl Enum. 2: 299. *C. maritimus* var. *crassipes* C.B.Cl.—F.T.A. 8: 326; Chev. Bot. 693. A stout perennial with dense spherical heads and thickened leaf-bases, found on the seashore and on sandy soil.
Senegal: (June)! Mbidjem! Sierra Leone: Yele, Turtle Islands (Nov.)! Njungeu (Jan.)! Ivory Coast (July)! Gold Coast (Nov.)! Togo: Lome! Dahomey: Cotonou (April)! S. Nigeria: Lagos! Leckie (May)! Tropical African coast generally, and in Madagascar and Cape Verde Islands. Exsicc.—Roger. Heudelot 478. Bolle. Thierry 86. Deighton 2022; 2308. Thomas 7297. Chipp 281. Irvine 802. Warnecke 138. Chevalier 23; 473. Dalziel 1108; 1295. Millen 160. Cunningham.
10. *C. effusus* Roth.—F.T.A. 8: 325. *C. cruentus* var. *excisus* C.B.Cl.—F.T.A. 8: 325. A slender sedge from 12–18 in. high with pale brown spikelets.
Senegal! Also in N.E. Africa, Egypt, Syria, Arabia, Socotra and Sind. Exsicc.—Roger! Heudelot 157.
11. *C. angolensis* Boeck.—F.T.A. 8: 321. A perennial with creeping habit; stems up to 1 ft. high.
N. Nigeria: Vom, Bauchi Plateau, 3,000–4,500 ft. Also in S. Tropical Africa. Exsicc.—Dent Young 259.
12. *C. uncinatus* Poir.—F.T.A. 8: 328. A small sedge with an umbel of brown flattened spikelets, 3–6 in. high; common in sandy soil.
Sierra Leone: Rowala (July)! Mayosso (Aug.)! Makump (Aug.)! Kitchom (Jan.)! Newton (Nov.)! Ivory Coast: Dyoles (April)! N. Nigeria: Nupe! Bauchi Plateau (Aug.)! S. Nigeria: Lagos. Common in all tropical and warm temperate regions. Exsicc.—Thomas 1090; 1426. Deighton 940; 1388; 1441; 2034. Chev. 21184. Barter 1569. Lely P. 459. Macgregor 19.
13. *C. reduncus* Hochst. ex Boeck.—F.T.A. 8: 329; Chev. Bot. 694. A sedge with panicles of green spikelets and long bracts, 6–12 in. high, found in damp places.
French Sudan: Pont Nafadie (Oct.)! Senegambia! N. Nigeria: Nupe! Kabba Road (Oct.)! Bauchi Plateau (Oct.)! S. Nigeria: Ogorude (Jan.)! Also in the Nile district and S. Central Africa. Exsicc.—Chev. 2427. Heudelot 172. Barter 908. Parsons 31. Lely P. 787. Holland 257.
14. *C. cruentus* Roth.—F.T.A. 8: 325; Chev. Bot. 690. A pale straw-coloured sedge 8–12 in. high with leathery leaves.
French Sudan: Timbuctou (July)! Between Kabarah and Day (Aug.)! Also in N.E. Africa, Egypt and Arabia. Exsicc.—Chev. 1235; 1346.
15. *C. conglomeratus* Roth.—F.T.A. 8: 324; Chev. Bot. 690. A sedge, 8–12 in. high with an umbel of dense heads of spikelets.
Senegal! Also in Central Sahara, Nile Land, Arabia and the Mediterranean region. Exsicc.—Roger 69.
16. *C. compressus* Linn.—F.T.A. 8: 347. A slender sedge with greenish spikelets, common by roadsides and in waste places.
Sierra Leone: Njala (Aug.)! Rogbasa (Aug.)! Newton (Nov.)! Bendu (April)! Bonthe (Nov.)! Also in most tropical and subtropical countries. Exsicc.—Deighton 771A; 771B; 1271; 1438; 1606; 2082; 2262.
17. *C. tenuispica* Steud. Syn. Pl. Cyp. 11. *C. flavidus* C.B.Cl. not Retz.—F.T.A. 8: 333; Chev. Bot. 691. A weak straggling sedge 4–12 in. high.
Senegal: Tamboukané (Dec.)! Gold Coast: Accra (Oct.)! N. Nigeria: Nupe! Tropical Africa generally and in the Seychelles, S.E. Asia and N. Australia. Exsicc.—Chev. 2444. Roger 38. Dollinger 14. Johnson 1003. Barter 1566.
18. *C. Haspan* Linn.—F.T.A. 8: 332; Stapf 663. Holl. 763; Chev. Bot. 691. *C. foliaceus* C.B.Cl.? A common weed in rice fields and sandy soil, up to 18 in. high, with reddish spikelets and short leaves.
French Sudan: Ouacoro (Dec.)! Sierra Leone: Mabum (Aug.)! Kundiata, Scaries! Mano Salija (Nov.)! Kuntu (Jan.)! Njala (Sept.)! Liberia: Gbanga (Sept.)! Peatlah (Oct.)! N. Nigeria: Narazuta (April)! Lemme (May)! Bauchi Plateau (Aug.)! Sokoto! S. Nigeria: Lagos! River Nun! A weed in all hot countries. Exsicc.—Chev. 78. Thomas 1541. Sc. Elliot 5039. Deighton 324; 324B; 910; 2098. Linder 698; 949. Lely 95; 154; P. 483. Dalz. 459. Macgregor 28. T. Vogel 13. (See Appendix).
19. *C. denudatus* Linn.—F.T.A. 8: 338; Chev. Bot. 690. A perennial up to 2 ft. high with short leaves and bracts and yellowish spikelets.
French Sudan: Slenso near San (June)! N. Nigeria: Nupe! Generally in Tropical Africa, also in S. Africa and Madagascar. Exsicc.—Chev. 1050. Barter 1572.
20. *C. Adansonii* C.B.Cl.—F.T.A. 8: 335.
Senegal. Exsicc.—Adanson.
21. *C. amabilis* Vahl.—F.T.A. 8: 327; Chev. Bot. 688. A slender tufted annual with panicles of flattened, narrow, reddish spikelets 6–8 in. high.
French Guinea: Kouroussa (July)! Ivory Coast: Mankow (June)! N. Nigeria: Nupe! Sokoto (Nov.)! Bauchi Plateau (Aug.)! S. Nigeria: Patti Mt.! Lagos! Tropical Africa generally and also in S. Africa, Madagascar, India and Tropical America. Exsicc.—Pobéguin 409. Chev. 21949. Baikie. Moiser 134. Dalz. 462. Lely P. 479. T. Vogel 193. Macgregor 31.
22. *C. tenax* Boeck.—F.T.A. 8: 334; Stapf 663. A tufted perennial 8–16 in. high with dark brown spikelets and short leaves.
Sierra Leone: Tisane, Bonthe Island (Nov.)! Liberia: Monrovia (Nov.)! S. Nigeria: Lagos! Tropical Africa generally, also Natal and the Transvaal. Exsicc.—Deighton 2012; 2296. Linder 1433. Dalz. 114.
23. *C. difformis* Linn.—F.T.A. 8: 330; Chev. Bot. 690. A sedge with panicles of small pale spikelets and leafy bracts, up to 2 ft. high; common in marshes and damp places.
French Sudan: Kati (Jan.)! Senegambia! French Guinea: Kouroussa (Jan.)! Sierra Leone: Falaba! Kumpote (July)! Near Semihun (Dec.)! Sekondi! Kuntu! Near Giema (April)! Liberia: Gbanga (Sept.)! Dahomey: between Massé and Kétou (Feb.)! N. Nigeria: Sokoto! S. Nigeria: Lagos! Tropical Africa generally and also in tropical and warm temperate regions of the Old World. Exsicc.—Chev. 181; 23011. Heudelot 213. Pobéguin 625. Sc. Elliot 5158. Thomas 1030. Deighton 293; 630; 1005; 1642. Linder 707. Baikie. Dalz. 460. Dawodu 37. (See Appendix).

24. *C. microlepis* Boeck.—F.T.A. 8: 330; Chev. Bot. 693. Like the above but more slender.
N. Nigeria: Jeba! Also in Nile Land. Exsicc.—Barter.
25. *C. diffusus* Vahl—F.T.A. 8: 343. A large sedge about 2 ft. high with a compound, sometimes proliferous, umbel and long foliaceous bracts, common in shady and marshy places.
From Sierra Leone to Southern Nigeria and Fernando Po and Princes Island. Also in Lower Guinea and common throughout the tropics. Exsicc.—Thomas 994. Linder 503. Chev. 22003. Holland 101. T. Vogel. Mann.
26. *C. Renschii* Boeck.—F.T.A. 8: 345; Chev. Bot. 694. Sedge up to 6 ft. high with a spreading divaricate umbel of brownish spikelets.
Sierra Leone: Yetaya (Sept.)! Gold Coast: Kwaha (April)! Cameroons Mt., 2,000–3,000 ft. Tropical Africa generally and in the Comoro Islands. Exsicc.—Thomas 2444. Johnson 689. Burton & Cameron. Mann 2103. (See Appendix).
27. *C. Mannii* C.B.Cl.—F.T.A. 8: 341, partly. A sedge up to 3 ft. high, with leaves and bracts about $\frac{1}{2}$ in. broad, and a compound umbel of reddish-brown spikelets.
Cameroons Mt., 6,000–10,000 ft. Murusuceler (Jan.)! Buea, 3000–5,000 ft. (Jan.)! Fernando Po, 6,000–7,000 ft. (April)! Exsicc.—Johnston 46. Maitland 347; 348; 356. Steele 94. Mann 320; 1358; 1479; 2107.
28. *C. aristatus* Rottb.—F.T.A. 8: 348; Chev. Bot. 689. A small tufted annual up to 7 in. high with an umbel of green-brown spikelets.
French Sudan: between Koupela and Ouagadougou (July)! Senegal: Wallo (May)! Senegambia! Gold Coast: Accra! N. Nigeria: Nupe! Yola (Sept.)! Sokoto! Bauchi Plateau (Aug.)! S. Nigeria: Lagos! Tropical Africa generally and also in India, Australia and nearly the whole of America. Exsicc.—Chev. 24583. Roger 68. Heudelot 328. T. Vogel 13. Barter 1570. Dalz. 268; 452. Lely P. 488. Macgregor 11.
29. *C. Iria* Linn.—F.T.A. 8: 346; Chev. Bot. 692. A sedge about 1 ft. high, with spreading panicles of yellow spikelets.
French Sudan: Tayuinbine! Mossi (Aug.)! Also in Nile Land and in S. and E. Asia, Malaya and Australia. Exsicc.—Chev. 2430; 24693.
30. *C. incompressus* C.B.Cl.—F.T.A. 8: 348. A sedge up to 2 ft. high with a loose umbel of pale spikelets, found in swamps.
Sierra Leone: near Kambia (Dec.)! S. Nigeria: Sikiti (Jan.)! Exsicc.—Sc. Elliot 4373. Dodd 390.
31. *C. procerus* Rottb.—Fl. Brit. Ind. 6: 810. A sedge about 2 ft. high with 3 unequal bracts, 1 longer than the umbel; umbel rather congested, about 3 in. long.
French Sudan: Mossi (July)! Also in Nile Land, Egypt and India. Exsicc.—Chev. 24585.
32. *C. imbricatus* Retz. Obs. 5: 12 (1789). *C. radiatus* Vahl—F.T.A. 8: 369; Chev. Bot. 694. A large sedge up to 2 ft. high with dense pale brown spikes.
Senegal: Galam! Sierra Leone! Gold Coast: Black Volta River, Ashanti (July)! N. Nigeria: Nupe! Sokoto (July)! Abinsi (July)! S. Nigeria: Lagos, on Ikoyi Plains (April)! Lokoja! Tropical Africa generally and in Madagascar, S.E. Asia and Tropical America. Exsicc.—Heudelot 211; 522. Sieber. Gay. Thomas 10461. Chipp 503. Barter 1127. Dalz. 466; 816; 1296. Baikie. Dalton.
33. *C. auricomus* Sieber ex Spreng.—F.T.A. 8: 373; Chev. Bot. 689; Holl. 761. A sedge 2–6 ft. high, with loose spikes of narrow spikelets, bracts foliaceous, far overtopping the umbel.
French Sudan: Siensio near San (June)! Senegal: Walo (Dec.)! Senegambia! N. Nigeria: Nupe! Sokoto! Tropical Africa generally and in Egypt. Exsicc.—Chev. 1057. Sieber 3. Roger 67. Heudelot 322; 500. Barter 1565. Dalz. 548. (See Appendix).
34. *C. dives* Del. Fl. Egypte, 5, t. 4, fig. 3. *C. exaltatus* Retz var. *dives* C.B.Cl.—F.T.A. 8: 370; Holl. 762. A sedge 4–6 ft. high with a spreading panicle of close spikes and 3 long foliaceous bracts.
N. Nigeria: Abinsi! Katagum! Bauchi Plateau (Aug.)! Nabardo (May)! S. Nigeria: Lagos! Tropical Africa generally and in Egypt, Syria, Madagascar and India. Exsicc.—Dalz. 239; 819. Lely 203; P. 461. Macgregor 119. (See Appendix).
35. *C. atroviridis* C.B.Cl.—F.T.A. 8: 359. A sedge about 10 in. high, with a contracted head of blackish-purple spikelets.
Fernando Po, 8,500 ft. Exsicc.—Mann 1466.
36. *C. Heudelotii* C.B.Cl.—F.T.A. 8: 894.
Senegal. Exsicc.—Heudelot.
37. *C. distans* Linn. f.—F.T.A. 8: 349; Chev. Bot. 690. A common sedge 1–3 ft. high, with a compound umbel of narrow reddish spikelets.
From Senegal to S. Nigeria and Fernando Po. Also common in Africa generally, the Mascarenes and nearly all warm regions. (See Appendix).
38. *C. callistus* Ridley—F.T.A. 8: 355. A slender sedge 8–24 in. high, with brownish spikelets.
Dahomey! Also in Uganda, Tanganyika Territory, Angola and Damaraland. Exsicc.—Newton 10.
39. *C. bulbosus* Vahl—F.T.A. 8: 325; Chev. Bot. 689. A slender sedge 6–10 in. high arising from a bulb, inflorescence often reduced to one spike.
Senegal (June)! N. Nigeria: between Shari and Chad (Oct.)! Nile Land and Lower Guinea. Also in Egypt, Arabia, India and N. Australia. Exsicc.—Roger. Perrottet 883. Golding 14B. (See Appendix).
40. *C. locuplex* C.B.Cl.—F.T.A. 8: 362. A sedge with a congested umbel 6–7 in. in diameter.
N. Nigeria: Nupe, Muve! Exsicc.—Barter 187.
41. *C. Fenzelianus* Steud.—F.T.A. 8: 368. A sedge 1 $\frac{1}{2}$ –2 ft. high with long leaves and bracts and reddish-brown spikelets.
Senegal: (Jan.)! Lake Guier (June)! Also in the Cameroons, N. and E. Africa, Arabia, Persia and India. Exsicc.—Dollinger 22. Roger.
42. *C. Baikiei* C.B.Cl. in Durand & Schinz, Conspect. Fl. Afr. 5: 550. *C. maculatus* C.B.Cl. in F.T.A. 8: 363, partly. A sedge with a congested inflorescence of pale brown spikelets found on sandbanks in the river.
Sierra Leone: between Bumban and Fort Lokko (April)! Makump (May)! Ndalljula (May)! Njala (May)! Samaia (May)! Mabum! N. Nigeria! Exsicc.—Sc. Elliot 5676. Deighton 705; 741; 746; 1711; 1716; 1752. Thomas 214; 1543. Baikie. (See Appendix).
43. *C. Schweinfurthianus* Boeck.—F.T.A. 8: 361. A sedge with a loose panicle of yellowish-brown spikelets, 1–2 ft. high, stem scabrid at the top.
N. Nigeria: Nupe! Lokoja district! Abinsi (June)! Bauchi Plateau (Aug.)! S. Nigeria: Lagos (Nov.)! Shaki (May)! Abbeokuta! Ikorodu, Yorubaland! Also in Togo, Nile Land and Lower Guinea. Exsicc.—Barter 1573. Richardson 4. Dalz. 827. Lely P. 458. Macgregor 30. Miller 107. Lagos Govt. 61. Irving. Schlechter 12297. (See Appendix).
44. *C. Zollingeri* Steud.—F.T.A. 8: 360; Stapf 663; Chev. Bot. 695. *C. permacer* C.B.Cl.? Very similar to the above, but the stem smooth at the top.
French Guinea: Kouroussa (July)! Sierra Leone: Mabum (Aug.)! Njala (June)! Bumban (Aug.)! Gold Coast: Accra (April)! Kumawo, Ashanti (June)! Liberia: Duport (Nov.)! N. Nigeria: Yola (June)! Baro (Oct.)! Bauchi Plateau (Aug.)! Tropical Africa generally and in tropical and subtropical Asia and Australia. Exsicc.—Pobéguin 423. Glanville 352. Thomas 1542. Deighton 743; 745; 1291; 2015; 2121. Linder 1447. Lloyd Williams 557. Irvine 654. Johnson 1026. Chipp 471. Dalz. 173; 260. Parsons 12. Lely P. 491. (See Appendix).
45. *C. maculatus* Boeck.—F.T.A. 8: 363 (excl. syn. *C. Baikiei* C.B.Cl.); Chev. Bot. 692; Holl. 763. A sedge common on sandy soil and by stream sides, with a panicle of pale straw-coloured spikelets.
Sierra Leone: Makump (May)! N. Nigeria: Nupe! Abinsi (March)! Sokoto! Tropical Africa



FIG. 346.—*CYPERUS ARTICULATUS* Linn. (CYPERACEAE).
A, part of stem, showing nodes. B, spikelet. C, flower and glume.

- generally and in the Mascarenes. Exsicc.—*Deighton* 1710. *Barter* 1213; 1571. *Dalz.* 474; 811. (See Appendix).
46. *C. sphacelatus* *Rotth.*—F.T.A. 8: 346; *Stapf* 663; *Chev. Bot.* 695. A common weed of waste places, with a spreading panicle of pale straw-coloured spikelets, often purple spotted.
From French Sudan to Fernando Po and in Lower Guinea. (See Appendix).
Var. *tenuior* *C.B.Cl.*—F.T.A. 8: 347. A slender annual about 10 in. high with flaccid leaves and bracts. Senegal! Exsicc.—*Heudelot* 485.
47. *C. esculentus* *Linn.*—F.T.A. 8: 355; *Chev. Bot.* 691; *Holl.* 761. A sedge 6–24 in. high with panicles of yellowish-brown spikelets.
French Guinea! Kouroussa (July)! Senegal (June)! Sierra Leone! N. Nigeria! Sokoto (July)! Bauchi Plateau (April)! *Kauwa*! Tropical Africa generally and in nearly all warm countries. Exsicc.—*Pobéguin* 404. *Roger. Vogel* 31. *Dalz.* 468a; 469. *Lely* P. 244. (See Appendix).
48. *C. gracilinox* *C.B.Cl.*—F.T.A. 8: 362. *C. gracilinox* var. *platyphylla* *C.B.Cl.* A slender perennial sedge with a loose panicle of narrow greenish spikelets, the bracts longer than the same.
Senegal. Sierra Leone. Gold Coast: Achimota (Feb.)! Nigeria! Also in Jurland. Exsicc.—*Irvine* 654. *Baikia*.
49. *C. rotundus* *Linn.*—F.T.A. 8: 364; *Chev. Bot.* 694; *Holl.* 766. A very common weed with reddish spikelets varying much in size and form.
From the Sudan to N. Nigeria and in Tropical Africa generally; a rice-field weed everywhere. (See Appendix).
A specimen collected by Adanson 164A, from Senegal, included by Clarke in F.T.A. 8: 369 under *C. tuberosus* *Rotth.*, probably belongs here.
50. *C. articulatus* *Linn.*—F.T.A. 8: 356; *Chev. Bot.* 689; *Holl.* 760. A sedge 3–6 ft. high, with an articulate stem about $\frac{1}{2}$ in. in diameter, found in salt and mud marshes. Used for mat-making.
From Senegal to Fernando Po and in Tropical Africa generally. Also in warm and tropical regions of both hemispheres. (See Appendix).
51. *C. Papyrus* *Linn.*—F.T.A. 8: 374; *Chev. Bot.* 693; *Holl.* 764. A tall sedge with subsolitary stems 8–15 ft. high and no leaves, umbel of many fine rays up to 1 ft. long, found in swamps.
N. Nigeria! Besagana, Danigie! S. Nigeria! Lagos! Also in the Gabon, Congo, Angola and Nyasaland, and in Sicily. Exsicc.—*Barter* 20153. *Golding* 23. (See Appendix).

Imperfectly known species.

- C. recurvus* *Vahl*—F.T.A. 8: 376. Sierra Leone. Coll. ? (not seen).
C. dilatatus *Schum. & Thonn.*—F.T.A. 8: 375. "Guinea." *Thonning* (not seen).
C. bulamensis *Steud.*—F.T.A. 8: 375. Portuguese Guinea: Bissagos Islands; Bulama. Coll. ? (not seen).
C. Karischmannii *C.B.Cl.* in *Kew Bull.* Addit. Ser. 8: 5. Togo. Exsicc.—*Kersting* 659 (not seen).

13. MARISCUS Gaertn.—F.T.A. 8: 377.

Spikelets very short and crowded into a dense ovoid or globose head :

Stem-bases thick :

Upper glumes blunt, the spikelet appearing blunt, arranged in a dense oblong-cylindric head about 2 cm. long ; glumes closely ribbed ; bracts leaf-like, up to 15 cm. long ; nut smooth. 1. *dubius*

Upper glumes acute, giving the spikelet a pointed appearance ; spikelets arranged in a dense subglobose head about 1.5 cm. diam. ; glumes closely ribbed ; bracts several and leaf-like ; nut sharply angular, smooth 2. *coloratus*

Stem-bases very slender and not thickened ; upper glumes very sharply pointed ; spikelets rather laxly arranged in a globose head subtended by long leaf-like bracts ; nut sharply angular. 3. *Soyauxii*

Spikelets longer and mostly arranged in umbellate more or less stalked spikes :

Spikelets comparatively short and forming a dense more or less continuous spike at most 1 cm. diam. :

Spikelets more or less tinged with red, densely crowded ; spikes mostly branched ; coarse growing plant with tall stems, with long and broadish serrulate leaves and leaf-like bracts 4. *ligularis*

Spikelets pale green or straw-coloured, spreading or reflexed ; spikes mostly unbranched and distinctly pedunculate ; stems swollen at the base ; glumes striately ribbed 5. *umbellatus*

Spikelets comparatively long, forming a lax spike :

Spike about 2 cm. diam. ; spikelets very narrow and slender, nervose ; stems slender ; leaves and bracts narrower than above 6. *flabelliformis*

Spike pyramidal in outline, about 4 cm. broad at the base ; spikelets lax and flexuose, glumes spreading, strongly nerved ; bract-like leaves longer than the inflorescence 7. *baoulensis*

1. *Mariscus dubius* *Hutch.* in *Kew Bull.* 1936 : ined. *Cyperus dubius* *Rotth.* *M. Dregeanus* *Kunth*—F.T.A. 8: 380.
French Sudan : Lake San (June)! Ivory Coast : various localities! Gold Coast : Accra! Achimota! Widely spread in Tropical and South Africa, Mascarenes, India and Borneo. Exsicc.—*Vogel. Irvine* 788. *Chev.* 16358, etc.
2. *M. coloratus* *Nees*—F.T.A. 8: 381.
Sierra Leone : Sekondi (Mar.)! Kabala, mountain at 2,000 ft. (July)! Gold Coast : Aquapim! Aburi! Half Assinie, sea front (July)! S. Nigeria : Jebba! Widely spread in Tropical Africa. Exsicc.—*Deighton* 623. *Glanville* 218. *Vogel. Johnson* 843; 844. *Chipp* 269. *Barter*.
3. *M. Soyauxii* *C.B.Cl.*—F.T.A. 8: 393.
Gold Coast : Kwahu, 2,000 ft. (Apr.)! S. Nigeria : Lagos; Ikoyi Plains (June)! Also in Gabon. Exsicc.—*Johnson* 663; 1038. *Dalz.* 1431.
4. *M. ligularis* *Hutch.* in *Kew Bull.* 1936 : ined. *Cyperus ligularis* *Linn.* *M. rufus* *H.B. & K.*—F.T.A. 8: 396; *Stapf* 663. Stems 3 ft. or so high, tufted.
Senegal : Casamance! Sierra Leone : near Waterloo, edge of mangrove swamp (Aug.)! Mambo, edge of tidal swamp (Jan.)! Ivory Coast : various localities! Gold Coast : Accra, near the beach (July)! Togo : near Lomé! S. Nigeria : around Lagos! Victoria! Fernando Po! Also in Atlantic Islands, Mascarenes and Tropical America. Exsicc.—*Heudelot* 442. *Farmar* 57. *Vogel* 42. *Deighton* 1006;

2045. *Burton*. Irvine 763. *Warnecke* 136. *Millen* 219. *Dalz.* 1305. *Barter*. *Maitland* 31. (See Appendix).
5. *M. umbellatus* Vahl.—F.T.A. 8: 390; Stapf 663; *Holl.* 766. *Scirpus cyperoides* Linn. (not *Mariscus cyperoides* A. Dietr.). *M. Sieberianus* Nees—F.T.A. 8: 388; *Chev. Bot.* 697. *M. nossibeensis* Steud. *M. macer* C.B.Cl.—F.T.A. 8: 392, partly, not of Kunth.
- Widely distributed in the tropics, and somewhat variable. (See Appendix).
6. *M. flabelliformis* H.B. & K.—F.T.A. 8: 397. *Cyperus* aff. *C. maculatus* A. Chev. Bot. 692, not of Boeck. *M. aximensis* C.B.Cl.—F.T.A. 8: 398.
- French Guinea and Sierra Leone to Nigeria, and to Angola; also in Tropical Asia, Polynesia and America. *Exsicc.*—*Thomas* 304; 1040. *De Gurig* 37. *Dalz.* 1300. *Holl.* 48. *Schlechter* 13017. *Macgregor* 36; 97. *Migeod* 103. *Maitland* 1288. *Deighton* 608; 747. *Chev.* B22268. (See Appendix).
7. *M. baoulenis* Hutch. in Kew Bull. 1936; ined. *Pycreus baoulenis* A. Chev. Bot. 695, name only. *Cyperus baoulenis* Kükenthal. Very closely allied to the South Tropical *M. Turritii* (*Cyperus Turritii* Kükenthal). Ivory Coast: Baoulé Nord Circle; near Kodiokoff (Aug.)! *Exsicc.*—*Chev.* 22336.
- Imperfectly known species.*
- M. foliosissimus* Steud.—F.T.A. 8: 402.
- Senegal? *Exsicc.*—*Lenormand*.

14. TORULINIUM Desv.—F.T.A. 8: 402.

- Leaves about 1.5 cm. broad, glabrous, nearly as long as the stem; stem closely ribbed; inflorescence a dense compound umbel of spikes; bract-leaves several, some much exceeding the inflorescence, scabrid on the margin; spikelets spreading at right angles, 1.5–2 cm. long; glumes loosely imbricate, broadly lanceolate, about 5 mm. long, glabrous, darkly straw-coloured; nut narrowly obovoid, mucronate, black; style-branches 3 *confertum*
- T. confertum* Hamilt.—F.T.A. 8: 403; *Chev. Bot.* 697. Stems up to 4 ft. high, stout, sharply triangular; bracteate leaves imbricate at the base.
- Dahomey: Zagnanado Circle! S. Nigeria: Ebute Meta (Nov.)! Throughout the tropics. *Exsicc.*—*Millen* 11. *Dawodu* 213. *Chev.* 23055.

15. KYLLINGA Rottb.—F.T.A. 8: 268.

- Rhizome creeping, more or less horizontal:
- Bracts subtending the heads long, usually very much longer than the heads; flowering stems usually with well-developed leaves towards the base:
- Leaves several and fairly long, the blade 6 cm. or more long; flowering stems not very wiry:
- Leafy bracts rigid and soon reflexed, 5 or more, rather short; head broadly ovoid to oblong, 1 cm. diam.; stem leaves up to 14 cm. long, 3–5 mm. broad, minutely scabrid on the midrib and margins; glumes spinulose-ciliate on the keel; rhizome closely knotted 1. *pungens*
- Leafy bracts flaccid and spreading:
- Glumes with a thick spongy keel, not visibly nerved, narrowly winged and toothed towards the middle; heads broadly ovoid, simple or subsimple, about 1 cm. long; leaves up to 20 cm. long and 5 mm. broad, glaucous green; rhizome creeping and loosely branched, not knotted 2. *nemoralis*
- Glumes strongly nerved and not spongy, the keel formed by the middle nerve; rhizome closely knotted:
- Head of 1 spike:
- Stems arising singly from the rhizome; leaves several on the stems; heads ellipsoid, less than 1 cm. long; glumes very sparingly ciliate on the keel 3. *erecta*
- Stems bunched from the rhizome; leaves very few on the stems; heads ovoid, about 1 cm. long; glumes distinctly ciliate on the keel 4. *melanosperma*
- Head of 5 spikes; leaves 20 cm. long, 3 mm. broad; spikes about 1 cm. long; glumes scabrous on the keel 5. *senegalensis*
- Leaves very short and few, the blade at most 4 cm. long; flowering stems very slender and wiry; bracts subtending the heads rather short and stiff; rhizome closely knotted 6. *colorata*
- Bracts subtending the heads very short, at most twice as long as the heads; flowering stems more or less leafless, the leaves reduced to sheaths or little more, acute, brown when dry; spikelets in a dense globose cluster about 1 cm. in diam.; keel of nut-bearing glume wingless, smooth 7. *peruviana*
- Rhizome not creeping, scarcely evident; tufted herbs with fibrous roots:
- *Keel of nut bearing glumes bristly, ciliate or denticulate:
- †Keel of glumes wing-like, broad, and minutely repand-denticulate; glumes acutely acuminate, 5 mm. long, with about 4 nerves on each side of the keel; leaves much shorter than the peduncle, minutely serrulate on the margin; peduncle up to 25 cm. long, ribbed; bracts 4–5, spreading, 5–8 cm. long; spike solitary, forming a subglobose head about 1 cm. diam. 8. *alata*
- ††Keel of glumes margined with coarse bristles or slender hairs or serrate-ciliate:
- Keel margined with coarse bristles tipped at the apex with 1–3 short hairs; glumes with 2 distinct nerves on each side of the keel; nut broadly elliptic, 1.5 mm. long; leaves weak, shorter than the peduncles, glabrous; bracts leaf-like, up to 10 cm.

long; spikes several in a small dense cluster, the jagged wing of the glumes very conspicuous in fruit 9. *squamulata*

Keel margined with slender simple hairs; glumes acuminate, with 2 nerves on each side of the keel; nut oblong-elliptic, 1.25 mm. long; leaves much shorter than the peduncle; bracts 3-4, spreading or recurved, 4-8 cm. long; spikes 1-3 in a small dense cluster, the glumes markedly nerved and inconspicuously ciliate in fruit 10. *controversa*

Keel winged, membranous, ciliate-denticulate; glumes acute, with 2 nerves on each side of the keel; nut oblong-elliptic; otherwise very similar to preceding 11. *pumila*

****Keel of nut bearing glumes glabrous:**

Spikelets composed of only 2 glumes:

Stem not bulbous at the base; head composed of 1 main cylindric spike about 1 cm. long; glumes 5-nerved on each side of the keel 12. *odorata*

Stem appearing bulbous at the base, thickened by leaf-sheaths; head usually of 3 well-defined ovoid spikes, or if solitary then more or less globose; glumes 2-3-nerved on each side of the keel 13. *triceps*

Spikelets composed of more than 2 glumes; heads usually composed of 3 well-defined spikes; glumes about 3-nerved on each side of the keel 14. *albiceps*

1. *Kyllinga pungens* Link.—F.T.A. 8: 277. Perennial with short creeping rhizomes and erect stems about 1 ft. high.

N. Nigeria: Nupe! Bauchi! Extends to East Africa and Angola, and in Tropical America. Exsicc.—Barter 1586. Lely P. 227.

2. *K. nemoralis* Dandy, MS. *Thyrocephalon nemoralis* Forst. *K. monocephala* Rottb. Descr. et Ic. 13, t. 4, fig. 4, partly.—F.T.A. 8: 272. Like the above but rhizomes slender and long, stems weak and leaves flaccid.

Gold Coast: Ashanti, in open spaces! S. Nigeria: Likomba, in banana plantations (Dec.)! Victoria! Cameroons Mt.: Buea, 4,000 ft.! Also in Atlantic Islands, Zambesi basin and warmer parts of Old World. Exsicc.—Irvine 470. Mildbr. 10790. Maitland 330; 712.

3. *K. erecta* Schum. & Thonn.—F.T.A. 8: 274; Stapf 662; Holl. 760. A herb 1-2 ft. high in sand, often near salt water; rhizome creeping; bracts comparatively short.

Gold Coast: Labadi (Mar.)! Bassa Cove! Togo near Lome! N. Nigeria: Nupe! Zaria (July)! S. Nigeria: Burutu (Sept.)! Tropical Africa generally, South Africa and Mascarene Islands. Exsicc.—Deighton 576. Ansell. Warnecke 139. Barter 1589. Parsons 3. Taylor 15. (See Appendix).

4. *K. melanosperma* Nees—F.T.A. 8: 277. Like the last but less leafy; bracts long and leaf-like. Sierra Leone: wet mud by Falaba (Mar.)! S. Nigeria: Lagos! Africa generally, Madagascar, India to Malaya. Exsicc.—Sc. Elliot 5187b. Macgregor 29.

5. *K. senegalensis* C.B.Cl.—F.T.A. 8: 276.

Senegal. Exsicc.—Lécard 215.

6. *K. colorata* Druce in Rep. Bot. Exch. Cl. Brit. Isl. 1916: 630 (1917). *Schoenus coloratus* Linn. *K. brevifolia* Rottb. Descr. et Ic. 13, t. 4, fig. 3.—F.T.A. 8: 273. Recognised at once by the densely knotted rhizome, very short leaves and involucre bracts.

Gold Coast: Accra Plains (Sept.)! Christianborg (Apr.)! S. Nigeria: Lagos Island! Tropics generally. Exsicc.—Johnson 1024. Irvine 663. Dalz. 1111!

7. *K. peruviana* Lam.—F.T.A. 8: 278; Stapf 662. Rhizome horizontal or ascending, closely covered by ovate rigid brown scales.

Widely spread from Senegal to Cameroons and Gabon, and in Tropical South America. Exsicc.—Heudelot 150. Deighton 2035; 2326; 2377. Linder 307. Thomas 7284. Fishlock 9; 22. Johnson 1002. Chipp 268. Dalz. 1112. Barter 63; 455; 1849. Rosevear 21.

8. *K. alata* Nees—Boeck. in Linnaea 35: 430. *K. alba* var. *alata* C.B.Cl.—F.T.A. 8: 272. *K. nigritana* C.B.Cl. l.c. Nearly 1 ft. high; roots slender, fibrous; leaves mostly basal, up to 6 in. long.

N. Nigeria: Nupe, in swamps! Also in Southern Africa. Exsicc.—Barter 1588, partly.

9. *K. squamulata* Vahl—F.T.A. 8: 270. A weak caespitose grass-like herb up to 1 ft. high, with fine fibrous roots.

Gambia! French Sudan: San (Sept.)! Sierra Leone: Njala, in grass in sunny places (July)! Rogbasa, by roadside (July)! N. Nigeria: Nupe! Sokoto, in cultivated fields (Aug.)! S. Nigeria: Lagos! Also in Eastern Sudan, Abyssinia and Uganda; N. India (dwarf form) and the island of Martinique, West Indies. Exsicc.—Hayes 568. Chev. 2485. Deighton 749; 1270. Baillie. Dalz. 451. Macgregor 12. (See Appendix).

10. *K. controversa* Steud.—F.T.A. 8: 270. *K. controversa* var. *subexalata* C.B.Cl. Less caespitose than preceding, the slender tapered leaves not half the length of the peduncles.

Senegambia! Sierra Leone: lawn at Makump (Aug.)! N. Nigeria: Sokoto, grassy meadows (Aug.)! Abinsi (May)! Nupe! Widely spread in Tropical Africa. Exsicc.—Heudelot 399. Deighton 1361. Dalz. 455; 824. Barter 1588, partly.

11. *K. pumila* Mich.—F.T.A. 8: 281; Stapf 662. Very closely allied to the preceding, and separable only by dissection of the glumes.

Senegal. Sierra Leone: Makump (May)! Yonibana (Nov.)! Mabum (Aug.)! Bumban (Aug.)! Liberia: Monrovia! Fernando Po (Oct.-Nov.)! Widely distributed in Tropical Africa and in America. Exsicc.—Barter. Deighton 1293; 1712. Thomas 1585; 4925. Vogel 11; 219. (See Appendix).

12. *K. odorata* Vahl Enum. Pl. 2: 382. *K. cylindrica* Nees—F.T.A. 8: 282; Stapf 662. Spherical head of white spikelets.

Sierra Leone: Sendugo (June)! Liberia: Bassa Cove! N. Nigeria: Bauchi Plateau (Aug.)! Cameroons Mt.: 7,000 ft.! Fernando Po, 7,500-8,500 ft. (Dec.)! Tropics and subtropics generally. Exsicc.—Thomas 558. Lely P. 475. Mann 659; 1474; 2104. Preuss 923.

13. *K. triceps* Rottb.—F.T.A. 8: 280. Compound head of white spikelets; up to 1 ft. high.

N. Nigeria: Yola (July)! Bauchi Plateau (Aug.)! Zaria (July)! Widely spread in Tropical Africa and in the eastern tropics. Exsicc.—Dalz. 264; 265. Lely P. 478. Taylor 21. (See Appendix).

14. *K. albiceps* Rendle—F.T.A. 8: 286; Chev. Bot. 698.

French Sudan: Lake San (June)! Sierra Leone: Pendembu (July)! Serabu to Taninahun (Apr.)! Freetown (Oct.)! N. Nigeria: Sokoto (July)! S. Nigeria: Calabar (May)! Lagos! Rio del Rey! Widely spread in Tropical Africa. Exsicc.—Chev. 1035. Thomas 774. Deighton 1697; 2148. Dalz. 453. Holland 50.

Imperfectly known species.

- K. debilis* C.B.Cl. in Bull. Soc. Bot. Fr. Mém. 8: 26.

French Sudan: Koulikoro (Oct.). French Guinea: Kouria (June). Exsicc.—Chev. 2455. Caille in Herb. Chev. 15087.



FIG. 347.—*KYLLINGA ERECTA* Schum. & Thonn. (CYPERACEAE).
A, spikelet. B, flower.

16. JUNCCELLUS C.B.Cl.—F.T.A. 8 : 306.

Spikelets arranged in spikes ; spikes umbellate, subsessile or pedunculate ; glumes soon falling off, leaving the transversely marked rhachilla, mucronate ; leaves minutely serrulate ; nut broadly elliptic, slightly biconvex 1. *alopecurioides*

Spikelets umbellate or capitate, rarely solitary :

Glumes at most acute ; spikelets not densely capitate :

Glumes white, without a spot ; spikelets 1 to several in a dense solitary sessile cluster ; leaves few, rigid, much shorter than the flowering stems, sometimes reduced to a sheath ; nut pale, flat on one side, rounded on the other

2. *laevigatus*

Glumes straw-coloured with a brown lateral blotch or brownish all over ; spikelets few and loosely umbellate, up to 2 cm. long ; leaves few, slender ; nutlet spadiceiform, flat on one side, keeled on the other, dark grey in colour

3. *pustulatus*

Glumes acuminate ; spikelets very short and densely capitate, heads about 1 cm. diam. ; stems short and very numerous ; leaves minutely scabrid on the margin ; nut very small, pale brown, 3-angled 4. *pygmaeus*

1. *Juncellus alopecuroides* C.B.Cl.—F.T.A. 8 : 307 ; Holl. 760. A tall annual with sharply triangular stem ; leafy bracts subtending inflorescence very unequal, some very long.

Senegambia : Cape Verde, in marshes ! Widely spread in tropics of Old World. Exsicc.—Brunner 64.

2. *J. laevigatus* C.B.Cl.—F.T.A. 8 : 308 ; Chev. Bot. 696, incl. var. *laucostachys* Willd. Stems up to 5 ft. high.

French Sudan : Taharant, 5,900 ft. (Mar.) ! Tibeghim, 2,500 ft. (Mar.) ! Silet, in old seepage channel,

2,500 ft. (Mar.) ! Timbuctu (July) ! Bilma ! Senegal : St. Louis island ! N. Nigeria : edge of Lake Chad

(Dec.) ! Common in all warm and temperate regions. Exsicc.—Meinertzhagen 208. Chipp 81 ; 96.

3. *J. pustulatus* C.B.Cl.—F.T.A. 8 : 307 ; Chev. Bot. 697. Growing in tufts ; leaves very narrow and slender,

much shorter than the flowering stems ; inflorescence compound, of sessile and pedunculate umbels of spikelets !

French Sudan : Koulikoro (Apr.) ! Mossi (Aug.) ! French Guinea : Kouroussa (Aug.) ! Sierra Leone :

Sendugu (June) ! Near Njala (Aug.) ! Tisana (Nov.) ! Gold Coast : Achimota (Sept.) ! N. Nigeria : in

pools on high rocks during the rains, Bauchi Plateau, etc. S. Nigeria : Lagos ; on rocks at Shaki ! Tropical

Africa generally. Exsicc.—Chev. 2474 ; 24720. Pobéguin 400. Thomas 604. Deighton 1836 ; 2321.

Irvine 851. Barter 1563. Macgregor 164. Lely P. 456 ; P. 466 ; P. 469. Taylor 13 ; 16. (See Appendix).

4. *J. pygmaeus* C.B.Cl.—F.T.A. 8 : 308 ; Chev. Bot. 697. Very dwarf, with numerous stems in a dense tuft.

Senegal : Galam. Tamboukane ! French Sudan : Timbuctu ! North Tropical Africa to China and

Australia. Exsicc.—Lélievre. Heudelot 387. Chev. 1237 ; 2443.

17. PYCREUS Beauv.—F.T.A. 8 : 288.

(With B. L. BURTT).

Glumes black ; spikelets in a dense sessile cluster up to 1 cm. long ; glumes with a narrow paler keel ; nut pale and smooth ; perennial ; stems tufted ; leaves about two-thirds as long as the flowering stems ; bracts 2, unequal 1. *cimicinus*

Glumes not black :

Flowering stems bearing leaves halfway up ; leaf-sheaths with a distinct purplish-brown truncate ligule ; blade linear, 6–8 cm. long ; spikelets umbellate and subsessile, scarcely 1 cm. long ; glumes pale brown ; nut smooth, pale brown

2. *Mundtii*

Flowering stems leafy only towards the base :

Glumes without a broad hyaline margin ; perennials or rarely annual ;

Spikelets short and ellipsoid, with about 5–6 glumes on each side, 4–5 mm. long ;

nut transversely marked ; bracts 3–4 to each cluster, very unequal, the longest

about 20 cm. long ; glumes prominently keeled *flavescens*

Spikelets more or less elongated or oblong, with more numerous glumes on each side :

Glumes white ; spikelets crowded in a cluster up to 1.5 cm. long ; bracts up to

15 cm. long ; stem-leaves with a truncate sheath ; nut smooth 3. *Smithianus*

Glumes straw-coloured or brown :

Glumes dark brown :

Perennials ; leaves not filiform :

Glumes acutely acuminate ; nut markedly tuberculate and glaucous, mucronate ;

flowering stem elongated ; bracts 2, unequal, the larger about 9 cm. long

4. *angulatus*

Glumes at most acute ; nut smooth ; flowering stems elongated ; spikelets

arranged in short spikes, about 1 cm. long 5. *globosus* var. *nilagirica*

Annual with filiform leaves ; nut smooth ; spikelets radiating in a cluster,

about 1 cm. long ; flowering stems very slender, up to about 30 cm. long

6. *capillifolius*

Glumes greenish or straw-coloured or pale brown :

Spikelets broad and flat, very obtuse, about 3.5 mm. broad, in an unbranched

cluster, up to 1.5 cm. long ; bracts 2–3, very unequal, the longest up to 12 cm.

long ; glumes 2.25 mm. long 7. *lanceolatus*

Spikelets narrow and acute or subacute, about 1.5 mm. broad, usually umbellate :

Leaves not filiform ; spikelets usually umbellate, about 1 cm. long ; bracts

several, leaf-like ; nut obscurely punctate 8. *odoratus*

- Leaves and bracts filiform; spikelets in a dense cluster, about 1 cm. long; nut wrinkled 9. *flavescens*
- Glumes with a broad hyaline margin:
- Glumes with a sharp recurved mucronate tip, opening away from the rachis; annual, flowering stems up to 20 cm. long; bracts and leaves very narrow; nut smooth 10. *pumilus*
- Glumes blunt at the apex; tall annual (or perennial?); spikelets in umbellate spikes, about 2 cm. long, the lower glumes soon falling from the rachis; flowering stems narrowly winged; leafy bracts very long; nut obovoid, black, minutely pitted 11. *tremulus*
1. *Pycreus cimicinus* H. Pfeiff. in Fedde Repert. 28: 17 (1930). *Cyperus cimicinus* Presl. (1830). *C. elegantulus* Steud. (1842). *P. elegantulus* C.B.Cl.—F.T.A. 8: 302. Leaves half as long as the flowering stems, the latter about 1 ft. high. Fernando Po, 8,500 ft. Widely spread in East Africa from the Red Sea to Nyassaland; also in South America. Exsicc.—Mann 1470.
 2. *P. Mundtii* Nees—F.T.A. 8: 294. Rhizome elongated and ascending; one umbel in the middle nearly sessile. N. Nigeria: Sokoto (July)! Throughout Africa, Mascarene Islands and in Spain. Exsicc.—Dolz. 465. Moiser.
 3. *P. Smithianus* C.B.Cl.—F.T.A. 8: 301. *P. cataractarum* C.B.Cl. *P. fluminalis* Ridl. *Cyperus cataractarum* K. Schum. ex C.B.Cl. Sierra Leone: Falaba (Apr.)! Fernando Po: Moka, 4,000–5,000 ft. (Jan.)! Also in French Cameroons, Congo, Angola, Uganda and Tanganyika. Exsicc.—Deighton 1645. Exell 834.
 4. *P. angulatus* Nees—F.T.A. 8: 305. *P. aff. djalonis* A. Chev. Bot. 696. Stems up to 3 ft. high, slender; leaves few towards the base; spikelets $\frac{1}{2}$ in. long. Ivory Coast: Baoulé-North Circle; between Kodiokoffi and Tiéouakrou (Aug.)! Also in Nyassaland, Rhodesia, S. Africa, India, Australia and Tropical America. Exsicc.—Chev. 22333.
 5. *P. globosus* var. *nilagrica* C.B.Cl.—F.T.A. 8: 299; Chev. Bot. 696. *Cyperus acuticarinatus* Kükenth.? Sierra Leone: Farana, alluvium of R. Niger, 3,500 ft. Ivory Coast: Mankano Circle! Tropical Africa and eastern tropics generally. Exsicc.—Sc. Elliot 5334. Chev. 21928.
 6. *P. capillifolius* C.B.Cl.—F.T.A. 8: 300; Chev. Bot. 695. Annual, tufted, up to 1½ ft. high; the longer filiform bract appearing as if continuing the stem. French Sudan: Koulikoro (Oct.)! French Guinea: Futa-Jallon, various localities! Sierra Leone: near Konta (Aug.)! Bumban (Sept.)! N. Nigeria: Kabba Road, fairly common in boggy places in bush (Oct.)! Bauchi Plateau (Aug.)! Extends to Abyssinia and Angola. Exsicc.—Chev. 2478. Deighton 1239. Thomas 2016. Parsons 33. Lely P. 465; P. 470.
 7. *P. lanceolatus* C.B.Cl. in Dur. & Schinz Consp. Fl. Afr. 5: 538 (1894), partly. *Cyperus lanceolatus* Poir. *P. propinquus* Nees—F.T.A. 8: 300, partly; Chev. Bot. 696. Perennial up to 1½ ft. high. From French Guinea to N. and S. Nigeria, widely distributed in Tropical Africa, Mascarenes and Tropical America. Exsicc.—Pobéquin 628. Thomas 1121. Deighton 1372; 1634. Sc. Elliot 5187a. Chev. 1141; 23495. Macgregor 187. Dolz. 464. Lely 96; P. 454; P. 482.
 8. *P. odoratus* Urb. Symb. Antill. 2: 164. *P. polystachyos* Beauv. Fl. Owar. 2: 48, t. 86, fig. 2.—F.T.A. 8: 296; Stapf 663. Perennial; roots fibrous; umbel with 3–6 leafy bracts up to 12 in. long. Senegal to S. Nigeria and in tropical and warm temperate countries throughout the world; mostly in the neighbourhood of the sea; a common and troublesome weed on the rice farms at the edge of tidal areas in Sierra Leone (Glanville). Exsicc.—Heudelot 444; 498. Brunner 165. Deighton 322. Glanville 216. Brown 303. Dolz. 471; 1299. Vogel 11; 35. Warnecke 123. Irvine 1402. Mann 530.
 9. *P. flavescens* Reichb.—F.T.A. 8: 290; Chev. Bot. 696. Stems tufted; bracts 2–4 below each head. French Sudan! French Guinea: Kouroussa (July)! N. Nigeria: Nupe, in rice fields! Widely distributed in many parts of the world. Exsicc.—Barter 1567. Pobéquin 420. (Form with rather few glumes, as in some Abyssinian examples.)
 10. *P. pumilus* Nees in Linnaea 9: 283 (not of C.B.Cl. in F.T.A. 8: 296). *Cyperus pumilus* Linn. *P. nitens* Nees—F.T.A. 8: 295. *P. pulvinatus* Nees—Chev. Bot. 696. Senegal: Dakar! French Sudan: Koulikoro! Sierra Leone: Yakala (Sept.)! Bunbuna (Aug.)! Ivory Coast: Baoulé Nord (July)! S. Nigeria! Widely distributed in the tropics of the Old World, extending to North Australia. Exsicc.—Heudelot 331. Thomas 2376. Deighton 1402. Macgregor 9. Chev. 2464; 15790; 22039.
 11. *P. tremulus* C.B.Cl.—F.T.A. 8: 306; Chev. Bot. 696. *Cyperus tremulus* Poir. *P. albomarginatus* Nees—F.T.A. 8: 305; Chev. Bot. 695. A large annual with solitary winged stems, and large usually compound umbel. French Sudan: San Banangué (Sept.)! Bani (June)! Senegal! Ivory Coast: Bliéron. N. Nigeria: Katagum distr.! Widely distributed in Tropical Africa, Mascarenes, India, Australia and South America. Exsicc.—Chev. 1090; 2484. Heudelot 537. Roger xx; 39. Dolz. 241.

Imperfectly known species.

P. djalonis A. Chev. Bot. 696, name only.

French Guinea: Futa-Jallon (Sept.)! Guerez country (Mar.). Exsicc.—Chev. 18613; 20978.

18. CATAGYNA Beauv. ex Lestib. Ess. Cyp. 26 (1819). (*Eriospora* Hochst. ex A. Rich.—F.T.A. 8: 511; not of Berkel. & Broome).

Stems erect or ascending, covered with the persistent leaf-bases (sometimes black through burning); leaves linear, pubescent or glabrous; ligule rounded-triangular, glabrous or shortly pubescent on the margin; panicle slender; peduncles variable, up to 2.5 cm. long, pubescent; clusters of spikelets straw-coloured or purplish, nearly 1 cm. long; nut 2 mm. long; hypogynous setae half the length of the nut, slender

Catagyna pilosa Hutch. in Kew Bull. 1936: ined. *Eriospora pilosa* Benth. in Hook. Ic. Pl. 14: 30, t. 1342.—F.T.A. 8: 512, incl. var. *longipes* C.B.Cl.; Chev. Bot. 709. Trunk ascending amongst granite rocks, or up to 2 ft. high, simple or branched, covered with the remains of the leaves; panicle slender; clusters of spikelets on short or long peduncles; roots form a mat on granite rock-slabs.

French Guinea: various localities (see Chev. l.c.)! Sierra Leone: Bumban (Sept.)! Binkola (Aug.)! Mandu, Southern Province, dominant on granite hills (July)! Ivory Coast: various localities (see Chev. l.c.)! Gold Coast: Afram Plains (Mar.)! Dahomey: small mountain near Agouagan (May)! N. Nigeria: Nupe! Top of Zaramda Mt. (May)! S. Nigeria: Isheri (June)! Lagos, in the interior! Exsicc.—All Chevalier's numbers (l.c.). Sc. Elliot 5644. Dave 509. Thomas 492; 1741; 2010. Deighton 1964; 1966. Johnson 708. Burbidge 549 (partly). Barter 1560. Lely 197. Rowland. Dawodu 59. (See Appendix).

19. *SCLERIA* Berg.—F.T.A. 8: 493.

Inflorescence spike-like, unbranched:

Nutlets smooth:

Bracts and glumes bristly-pilose with dark purple hairs; stems and leaves mostly rather densely pubescent; leaves sometimes nearly as long as the spike, sometimes the basal ones reduced; nutlet broadly oboeonic, slightly 3-angular

1. *hirtella*

Bracts and glumes glabrous or at most shortly pubescent or ciliate; stem and leaves glabrous or thinly pubescent; nut as in preceding species .. 2. *Schweinfurthiana*

Nutlets not smooth:

Nutlets transversely wrinkled:

Bracts and glumes pilose with whitish hairs or some purplish hairs

3. *melanotricha*

Bracts and glumes glabrous or nearly so.. .. 2. *Schweinfurthiana*

Nutlets muricate, white; bracts narrowly oblong, shortly subulate-acuminate, glabrous; glumes dark purple with paler margins; axis of inflorescence sharply angular 4. *pergracilis*

Nutlets honeycombed-reticulate, white; leaves rather broad and 3-nerved, the sheath ligulate and pubescent opposite the blade 5. *glandiformis*

Nutlets longitudinally ribbed; leaf-sheaths with a very prominent triangular hairy ligule opposite the blade; bracts and glumes shortly ciliate.. .. 6. *spiciformis*

Inflorescence paniculate:

Nutlet tuberculate or markedly reticulate-pitted:

Nutlet reticulate-pitted 5. *glandiformis*

Nutlet tuberculate:

Leaves very narrow, about 1.5 mm. broad; glumes ovate-triangular; panicle slender and delicate 7. *multispiculata*

Leaves broader, 1-1.5 cm. broad; glumes broadly ovate; panicle rather coarse and crowded 8. *verrucosa*

Nutlet smooth or sometimes very faintly reticulate:

Nutlet with a depressed annular ring around the top and persistent style-base; leaves large and broad, up to 2 cm. broad, with a triangular rugose ligule and prominent nerves 9. *racemosa*

Nutlet without a ring around the top:

Glumes subtending the nutlets very broadly ovate, abruptly and shortly mucronate-acuminate; nutlets ivory-white; leaves broad and prominently nerved; sheath shortly pubescent; ligule broadly triangular 10. *Vogelii*

Glumes subtending the nutlets more or less gradually acuminate:

Nutlets shortly pubescent, pale to dark purple, with an early deciduous style-base; habit long-scrabbling; ligule very conspicuous; leaf-blade with retrorse-scabrid margins; spikelets with filiform subtending bracts 11. *Barteri*

Nutlets glabrous:

Glumes with a tomentellous keel and acumen, purple or purplish, long-acuminate; clusters of spikelets more or less continuous; nutlets ivory-white and black at the apex; leaf-sheaths winged; ligule broadly triangular, rugulose

12. *melanomphala*

Glumes with the keel glabrous or nearly so:

Glumes ovate; leaf-sheaths pubescent towards the top all around; blades strongly nerved, pubescent; panicles axillary and terminal, rather small, purplish 13. *Naumanniana*

Glumes lanceolate; leaf-sheaths glabrous except the margin of the ligule:

Leaf-sheaths winged; leaves rather broad; stems erect

14. *canaliculato-triquetra*

Leaf-sheaths not or hardly winged; leaves very narrow; stems climbing

15. *lithosperma*

Leaf-sheaths not winged; leaves narrow; stems erect 16. *Lelyi*

1. *S. hirtella* Swartz.—F.T.A. 8: 497. *S. catophylla* C.B.Cl.—F.T.A. 8: 498. About 1 ft. high, usually pubescent all over; spikes interrupted, about 6 in. long.

Sierra Leone: Materbol (Oct.)! Between Kasokora and Bumban (Aug.)! Mano Salija (Nov.)! N. Nigeria: Nupe! Abinsi, in bush (Oct.)! Tropical Africa generally, S. Africa, Madagascar, and widely spread in America. Exsicc.—Glanville 88. Deighton 342; 1247. Barter 1561. Dalz. 821. Pobéguin 2273. (See Appendix).

2. *S. Schweinfurthiana* Boeck.—F.T.A. 8: 500. *S. Buchananii* Boeck.—F.T.A. 8: 499. Slender, 1-2 ft. high. French Guinea: Futa-Jallon (Sept.)! Sierra Leone: hills near Bumban, granite outcrop, 1,000 ft.! Liberia: Duport (Nov.)! N. Nigeria: Bauchi Plateau (May)! Kilba country (July)! Naraguta! Extends to Abyssinia and through East Africa to Nyasaland and Rhodesia. Exsicc.—Deighton 1248. Linder 1453. Lely P. 293; 300. Dalz. 266. Chev. 18688. (See Appendix).

3. *S. melanotricha* A. Rich.—F.T.A. 8: 495. Stems few in tufts, up to 1 ft. high. French Sudan: Koulikoro (Oct.)! French Guinea: Timbo (Oct.)! Sierra Leone: open bare path near Regent (Dec.)! Foni Flats, Brookfields (Oct.). Hill Station, on bush path (Oct.)! N. Nigeria: Bauchi Plateau! Extends through Ubangui to Kenya and Nyasaland. Exsicc.—Chev. 2467. Pobéguin 1790a. Sc. Elliot 4187. Morson. Deighton 243; 2141. Saunders 59. Lely P. 489. (See Appendix).



FIG. 348.—*SCLERIA RACEMOSA* Poir. (CYPERACEAE).

A, male and female spikelets. B, male spikelet. C, stamen. D, pistil. E, nutlet and glumes.

4. *S. pergracilis* Kunth.—F.T.A. 8: 495. *S. melanotricha* var. *glabrior* A. Chev. Bot. 711, not of C.B.Cl. Ivory Coast: Baoulé Sud (Aug.)! N. Nigeria: Nupe, common in swamps! S. Nigeria: Lagos, common on rocks! Extends through the Eastern Sudan to India. Exsicc.—Barter 1006. Macgregor 243. Chev. B. 22255.
5. *S. glandiformis* Boeck.—F.T.A. 8: 503. About 2 ft. high in water or marshy places. French Sudan: Koulikoro (Oct.)! Senegal! Liberia: Gbanga (Sept.)! Ivory Coast: Kodiokoffi distr. (Aug.)! N. Nigeria: Kontagora (Nov.)! Nupe! Also in Eastern Sudan. Exsicc.—Chev. 2468; 22368. Heudelot 662. Taylor 10. Dalz. 238. Lely 674; P. 775. Barter 1042. Linder 615. (See Appendix).
6. *S. spiciformis* Benth.—F.T.A. 8: 506; Stapf 665. Rhizome knotted; stems leafy, rusty-red towards the base; leaves pilose. Sierra Leone: Sugarloaf Mt., dry places on lower slopes (Dec.)! Bonthe Island (Nov.)! Liberia: Grand Bassa, in savannah (Sept.)! Dupont (Nov.)! Exsicc.—Sc. Elliot 3952. Deighton 2292. Vogel 107. Linder 1456.
7. *S. multispioulata* Boeck.—F.T.A. 8: 501. Slender, about 1 ft. high; panicle lax and graceful. French Guinea: Pita (Sept.)! Futa-Jallon (Sept.)! N. Nigeria: Nupe; swamp near Lom! Bauchi Plateau (Aug.)! Vodni! Also in South Central Africa from Angola to Nyasaland. Exsicc.—Barter 1349. Lely P. 446. Pobéguin 2274. Chev. 18622. Saunders 48.
8. *S. verrucosa* Willd.—F.T.A. 8: 509. Up to 10 ft. high, often in tufts; style-base persistent in fruit; lower sheaths winged. Sierra Leone: various locs.! Liberia: Sinoe Basin! Peáhtah! Gold Coast: Aburi, swampy districts (Oct.)! Akroso (Aug.)! Abetifi, Kwahu (Jan.)! S. Nigeria: Ebute Metta (Jan.)! Lagos! Victoria, sea-level (Jan.)! Extends to Lower Congo and Zanzibar. Exsicc.—Sc. Elliot 4218. Thomas 8692. Deighton 1777. Roadon 11. Johnson 232; 474. Hoves 953. Millen 94. Macgregor 101. Irvine 1829. Maitland 901. Linder 1080.
9. *S. racemosa* Poir.—F.T.A. 8: 508, incl. var. *depressa* C.B.Cl. About 5 ft. high, with rather dense panicles; nuts ivory white. Senegal: Casamance; Sedhiou (Feb.)! Gambia! Sierra Leone: various locs.! N. Nigeria: Kontagora (Nov.)! Nupe! S. Nigeria: Lagos! Extends to Eastern Sudan and south to Nyasaland. Exsicc.—Heudelot 368. Chev. 2449. Deighton 353. Dalz. 237. Barter 921. Thornewill 98. Millen 96. Irvine 1585. (See Appendix).
10. *S. Vogelii* C.B.Cl.—F.T.A. 8: 508; Stapf 665. Very like the preceding but nuts smaller and not ringed. Liberia: Grand Bassa (July)! Gbanga (Sept.)! N. Nigeria: Bauchi Plateau (Oct.)! S. Nigeria: Lagos! Ikoyi Plains, edge of swamp forest (June)! Abbeokuta! Cameroons Mt.: near Buea, 2,500 ft. (Mar.)! Extends to Gabon. Exsicc.—Vogel 59. Lely P. 799. Millen 154. Dalz. 1301. Irving. Maitland 553. Linder 516; 517; 598.
11. *S. Barteri* Boeck.—F.T.A. 8: 507; Stapf 665; Hutch. in Hook. Ic. Pl. t. 3191. A long scrambling often 20–30 ft. above the ground in dense moist bush; leaves retrorsely scabrid; ligule very conspicuous. Sierra Leone: Kambia, Scarceis (Jan.)! Njueh (Sept.)! Rowalla (Aug.)! Mabum (Aug.)! Liberia: Grand Bassa! Gold Coast: Assin Yan Kumasi! Tarkwa (Dec.)! S. Nigeria: Onitsha! Ilano (Jan.)! Fernando Po (Dec.)! Extends to Congo. Exsicc.—Sc. Elliot 4388. Dave 545. Deighton 2112. Thomas 1195; 1589. Drinklage 2010. Cummins 238. Johnson 1000. Hoves 988. Barter 1786. Millen 97. Vogel 87. Mann 113. Talb. 855.
- According to Barter this remarkable scrambler “climbs over shrubs and trees to the height of 20 ft., rendering passage impossible; said to form the impenetrable thickets of the Timne country in Sierra Leone.” (See Appendix).
12. *S. melanophala* Kunth.—F.T.A. 8: 506. In swamps about 5 ft. high with drooping inflorescence; leaf-sheaths winged; nut often black at the apex. Sierra Leone: various locs.! Liberia: Gbanga (Sept.)! Gold Coast: Axim (Dec.)! N. Nigeria: Bauchi Plateau! Tropical Africa generally, in the east south to Pondoland. Exsicc.—Sc. Elliot 5046. Dave 536. Deighton 1398; 1656. Thomas 2102; 2258. Johnson 1001. Saunders 26. Dent Young 262. Lely P. 486. Linder 513. (See Appendix).
13. *S. Naumanniana* Boeck. in Engl. Bot. Jahrb. 5: 94 (1883). *S. ovuligera* Nees ex Boeck. (1874), not of Reichb. ex Steud. (1855).—F.T.A. 8: 507; Stapf 665. Sierra Leone: various localities! Liberia: Grand Bassa! Gold Coast! S. Nigeria: Lagos, edge of swamp forest! Extends to Angola. Exsicc.—Deighton 1994; 1995; 2028. Dalz. 1302; 1303; 8251. Vogel 60. Hoves 989. Talb. 855. (See Appendix).
14. *S. canaliculato-triquetra* Boeck.—F.T.A. 8: 505. French Guinea: Kouroussa! Sierra Leone: Hill Station! Liberia: Du River (Aug.)! N. Nigeria: Abinsi (June)! S. Nigeria: Lagos! Oban! Also in East Africa and extends to Angola. Exsicc.—Pobéguin 401; 421. Deighton 2150. Linder 502. Dalz. 815. Talb. 854.
15. *S. lithosperma* Swartz.—F.T.A. 8: 502. Gold Coast: Krobo Girls' School, Odumase, in secondary clearings on old farms (June)! Tropical and subtropical regions. Exsicc.—Irvine 1644.
16. *S. Lelyi* Hutch. in Kew Bull. 1936: ined. Up to 1½ ft. high; ligule quite truncate, shortly pilose. N. Nigeria: Bauchi Plateau, common in grass lands (May)! Between Bukuru and Hephani, 4,300 ft. (July)! Naraguta (June)! S. Nigeria: Bum, Bamenda Mts., 4,000 ft. (May)! Exsicc.—Lely P. 292; 299; 348. Maitland 1527.

20. DIPLACRUM R.Br.—F.T.A. 8: 510.

- A low herb up to 10 cm. high; leaves linear, acuminate, 3.5–5 cm. long, glabrous, with a truncate sheath at the base; inflorescence of small shortly pedunculate axillary clusters; bracts long-subulate, 8 mm. long; spikelets about 5 to each head; glumes subulate-acuminate from an elliptic base; nutlet subglobose, closely longitudinally ribbed 1. *africanum*
- A stouter herb up to 1 m. high; leaves elongated, about 1 cm. broad; inflorescence of globose axillary shortly pedunculate clusters; spikelets numerous, the head over 1 cm. diam.; nutlet globose, white, faintly 3-nerved-angular, shining

2. *longifolium*

1. *D. africanum* C.B.Cl.—F.T.A. 8: 510. *D. longifolium* A. Chev. Bot. 711, not of C.B.Cl. In damp sandy places, often amongst tall grasses, sometimes very small. Senegal! Sierra Leone: various locs.! Liberia: Dupont! Ivory Coast: Ano! N. Nigeria: Nupe! Extends through the Ubangui district to Eastern Sudan and the Nile region of Uganda. Exsicc.—Heudelot 675. Sc. Elliot! Deighton 323; 946; 966; 1350. Barter 1041. Chev. 22535. Linder 1446.
2. *D. longifolium* C.B.Cl.—F.T.A. 8: 511. In marshes, 2–3 ft. high. Sierra Leone: marshy ground near Mofari Digisins (Jan.)! Malema (Nov.)! Liberia: near Kakatown, in wooded swamp (Aug.)! S. Nigeria: Lagos; Ikoyi Plains (Nov.)! Oban! Widely spread in South America. Exsicc.—Sc. Elliot 4406. Deighton 333. Talb. Dalz. 1294. Linder 343.



FIG. 349.—*MICRADRACOIDES SQUAMOSUS* Hua (CYPERACEAE).

A, spikelets. B, perianth. C, same and pistil. D, vertical section of fruit. E, fruit with perianth. F, spikelet. (Partly after Engler & Krause).

21. CAREX, Linn.—F.T.A. 8 : 514.

(By E. A. BRUCE).

Panicle narrow-elongate, composed of from 5–10 narrow cylindric spikes 4–6 cm. long : Terminal spike with utricles in upper part ; glumes golden-brown with pale midrib, apiculate ; 3–6 spikes to the panicle ; leaf bases pale brown or straw-coloured

1. *simensis*

Terminal spike with male in the upper part and no utricles ; glumes rich dark brown with pale midrib, apiculate ; 9–12 spikes to the panicle ; leaf base rich purple

2. *Mannii*

Panicle consisting of numerous short spikes at most 1.5 cm. long :

Beak of utricle not more than one-third as long as the body of the utricle ; leaves as long as the panicle, stiff, harsh, more than 0.5 cm. broad ; 25–35 spikes to the panicle ; glumes triangular-ovate, acuminate 3. *echinochloe*

Beak about two-thirds as long as the body of the utricle ; leaves shorter than the panicle, flaccid, less than 0.5 cm. broad ; 20–30 spikes to the panicle ; glumes broadly lanceolate 4. *chlorosaccus*

1. *Carex simensis* Hochst. ex A. Rich.—F.T.A. 8 : 522 ; Kükenth. in Engl. Pflanzenr. Cyperac.—Carticoid. 652, fig. 113. Erect herb 1–1½ ft. high ; spikes 1½–2 in. long.

Cameroons Mt. : 7,000–10,000 ft. (Dec.) ! Also in Abyssinia and the mountains of East Africa. Exsicc.—Mann 2099.

2. *C. Mannii* Bruce in Kew Bull. 1933 : 150. *C. Boryana* C.B.Cl. in F.T.A. 8 : 523, not of Schkuhr. *C. Boryana* var. *minor* Boott. *C. Boryana* var. *simplicissima* Kükenth. l.c. 651. About 2½ ft. high, with strikingly purple leaf-bases and slender spikes about 1½–2 in. long.

Cameroons Mt. : Ukele Camp, 6,000 ft., in open forest and grassland (Feb.) ! Fernando Po : 7,500–8,500 ft. (Dec.) ! Also on Ruwenzori Mt. (10,000 ft.). Exsicc.—Mann 661 ; 1478. *Maitland* 1341.

3. *C. echinochloe* Kunze Suppl. Schkuhr. Riedgr. 47, t. 12.—F.T.A. 8 : 518 ; Chev. Bot. 712 ; Kükenth. l.c. 270. *C. neo-Chevalieri* Kükenth. in Bull. Mus. Nat. Hist. Par. ser. 2, 3 : 467. Rhizome creeping ; stem 1½ ft. with small panicles of very short spikes.

French Guinea : Dalaba-Diaguissa Plateau ; Futa-Jallon, 3,000–4,000 ft. (Sept.–Oct.) ! Cameroons Mt. : 7,000 ft. (Nov.–Jan.) ! Also in East African mountains from Abyssinia to Usambara. Exsicc.—Mann 1359 ; 2106. Chev. 18776 ; 18827.

4. *C. chlorosaccus* C.B.Cl.—F.T.A. 8 : 519. *C. echinochloe* var. *chlorosaccus* Kükenth. l.c. 271. A grass-like sedge about 1 ft. high, with flaccid green leaves and narrow panicles of short spikes.

Fernando Po : 8,000 ft. (Dec.) ! Also on Kilimanjaro (7,200 ft.). Exsicc.—Mann 653.

22. MICRODRACODES Hua in Bull. Mus. Hist. Paris 12 : 421 (1906).

Arborescent habit (like a *Vellozia*), but only about 0.5–1 m. high ; stem branched woody, 1.5–2 cm. diam., completely covered with the truncate persistent leaf-bases ; leaves very crowded at the tops of the short branches, rigidly linear, acute, about 6 cm. long and 3 mm. broad, minutely serrulate ; inflorescence a loose panicle ; male flowers not known ; bracts subulate-acuminate from a sheathing base ; glumes narrowly oblong-lanceolate, subulate-pointed, about 7 mm. long . . . *squamosus*

M. squamosus Hua l.c. 422 ; Chev. Bot. 709. *Schoenodendron Buecheri* Engl. (1910). A small tree-like sedge on granite outcrops ; stem and branches covered with the persistent leaf-bases.

French Guinea : Grand Chutes (Dec.) ! Manbia (June). Lanfofon River (fr. Mar.). Kindia (Sept.). Sierra Leone : hills near Bumban (Aug.). S. Nigeria : Boki Hills, 3,000 ft. ! Mamfe, 4,000 ft. ! Cross River ! Also in French Cameroons. Exsicc.—Chev. 20222. Deighton 1309. *Migeod* 259. *Caterall*.

184. GRAMINEAE

Annual or perennial herbs, rarely shrubs or trees ; stems erect, ascending or prostrate and creeping, usually branched at the base, in perennials forming sterile shoots (innovations) and flowering stems (culms), in annuals only the latter present ; culms cylindrical, rarely flattened, jointed, usually hollow in the internodes, closed at the nodes. Leaves solitary at the nodes, sometimes crowded at the base of the stems, alternate and two-rowed, consisting of sheath, ligule and blade ; sheaths encircling the culm, with the margins free and overlapping or more or less connate, frequently swollen at the base (sheath-node) ; ligule placed at the junction of the sheath and blade, membranaceous or reduced to a fringe of hairs, rarely absent ; blades usually long and narrow, rarely broad, usually passing gradually into the sheath, rarely with a petiole-like base, flat, convolute or involute or terete, parallel-nerved. Flowers usually hermaphrodite, sometimes unisexual, small and inconspicuous, usually consisting of stamens and pistil and of 2 or 3 minute hyaline or fleshy scales (lodicules) representing the perianth, subsessile between 2 bracts (lemma and palea), the whole forming a floret or false flower. Florets 1 to many, distichous, sessile on a short or minute slender axis (rhachilla) and bearing at the base 2 empty bracts (upper and lower glume), the florets and glumes forming a spikelet. Spikelets pedicelled in open or contracted panicles or racemes, or sessile in

spikes. Stamens hypogynous, 1 to 6, rarely more, usually 3, with delicate filaments and 2-celled anthers, the latter opening usually by a longitudinal slip; ovary 1-celled, with 1 anatropous ovule often adnate to the adaxial side of the carpel; styles usually 2, rarely 1 or 3; stigmas generally plumose; fruit mostly a caryopsis with a thin pericarp adnate to the seed, or rarely a nut or a berry or a utricle with a free pericarp, with starchy endosperm and a small embryo at the base on the abaxial face.

Distributed throughout the world.

In compiling the account of this family I have made full use of the late Dr. O. Stapf's monumental work in the *Flora of Tropical Africa*, vol. ix, and of his and Mr. C. E. Hubbard's joint work in the later parts. Moreover, I am very greatly indebted to Mr. Hubbard for the key to tribes and genera, which are arranged according to his new classification published in my *Families of Flowering Plants*, vol. ii, *Monocotyledons* (1934). He has very kindly contributed the account of the difficult genus *Eragrostis*, and in addition has generously allowed me to consult the MS. of certain smaller genera (marked with an *) which he has prepared for the general *Flora*.

KEY TO THE TRIBES AND GENERA (By C. E. HUBBARD)

Key to the Tribes.

*Spikelets 1- to many-flowered, breaking up at maturity above the more or less persistent glumes, or if falling entire then *not* 2-flowered with the lower floret male or neuter and the upper hermaphrodite, usually laterally compressed or terete:

†Spikelets bisexual, similar:

Shrubs or trees with woody often tall persistent culms, very rarely perennial herbs; leaf-blades flat, many-nerved, often with transverse veins, usually with a petiole-like base and often articulated with the sheath; lemmas 5- to many-nerved, usually awnless; lodicules usually 3 I. BAMBUSEAE

Perennial or annual herbs, with herbaceous, very rarely somewhat woody, culms; leaf-blades usually sessile and not articulated with the sheaths, or if with a petiole-like base, then not with the other characters given above:

‡Spikelets borne in open or contracted or spike-like panicles, less often in one-sided racemes or spikes and then with 2 or more fertile florets and no long cilia along the margins of the lemma, or if with only 1 fertile floret then the leaf-blades transversely veined:

Spikelets usually with 2 or more fertile florets, or if with 1 fertile floret then with sterile florets above it:

Lemmas and rachilla-joints glabrous or shortly hairy, in the latter case with the hairs not enveloping the lemmas:

Glumes usually shorter than the lowest floret and with the upper florets distinctly exserted; lemmas awnless, or with a straight or curved awn from the entire or bifid apex, or several-awned or lobed:

Lemmas usually 5- to many-nerved, very rarely 3-nerved:

Lemmas entire or shortly 2-toothed at the apex, awnless or awned

II. FESTUCEAE

Lemmas deeply cleft into 3 to many subulate or lanceolate lobes, with or without fine straight awns from their sinuses IV. PAPPOPHOREAE

Lemmas 1- to 3-nerved VI. ERAGROSTEEAE

Glumes usually as long as or longer than the lowest floret, often as long as the spikelet and enclosing the florets; lemmas usually 5- or more-nerved, awnless or more often awned from the back or from the sinus of the 2-lobed tip, the awn usually geniculate; glumes or lemmas frequently with thin shining margins IX. AVENEAE

Lemmas or rachilla-joints bearing long silky hairs which envelop the former; lemmas awnless or with a straight awn from the tip; tall grasses with usually large plume-like panicles V. ARUNDINEAE

Spikelets with 1 fertile floret, with or without 1 or 2 male or barren florets below it:

Glumes very minute or suppressed; palea 3- or more-nerved; stamens often 6;

spikelets strongly compressed and flattened on both sides XIII. ORYZEAE

Glumes usually well developed, or at least the upper; palea usually 2-nerved; stamens 3 or less; spikelets usually not flattened:

Spikelets with 1 floret:

Spikelets usually breaking up at maturity, the rachilla disarticulating above the more or less persistent glumes, or if falling entire, then with 5-nerved lemmas:

Lemmas hyaline or membranous, rarely indurated and then not terete, awnless or awned from the back or bifid tip:

Lemmas 1- to 3-nerved, awnless; glumes and lemma very similar in texture,

hyaline or thinly membranous, the lower glume often shorter than the upper; grain usually with a free pericarp .. VIII. SPOROBOLAEAE
 Lemmas usually 3- to 5-nerved, frequently awned; glumes mostly longer and firmer than the lemma, or if lemma equalling the glumes, then sometimes firmer; grain usually with an adhering pericarp.. X. AGROSTAEAE
 Lemmas indurated and rigid at maturity, terete, with involute or convolute margins, usually with a terminal awn .. XI. STIPEAE
 Spikelets falling entire at maturity, either singly or in clusters, from the axis of slender spike-like panicles or racemes; lemma delicate, 1- to 3-nerved

XII. ZOISIEAE

Spikelets with 2 florets, the lower male or barren, the upper hermaphrodite

XVI. ARUNDINELLEAE

††Spikelets sessile or shortly pedicelled on opposite sides of the rhachis of solitary spikes, or along one side of the rhachis of solitary, digitate or scattered spikes or spike-like racemes and with 1 fertile floret (very rarely more, *Tetrapogon*, and then with long-ciliate lemmas) and 1- to 3-nerved lemmas:

Spikelets on opposite sides of the rhachis; lemmas 5-9-nerved III. HORDEAEAE

Spikelets along one side of the rhachis; lemmas 1-3-nerved .. VII. CHLORIDEAE

††Spikelets unisexual, dissimilar, the sexes mixed or in different parts of the same inflorescence:

Leaf-blades with slanting lateral nerves running obliquely from the midrib to the margin; fertile lemma papery, much longer than the glumes, clothed with minute hooked hairs; stigmas 3; stamens 6 .. XIV. PHAREAE

Leaf-blades with the lateral nerves parallel to the midrib; fertile lemma coriaceous to cartilaginous, smooth, usually shorter than the glumes; stigmas 2; stamens 2 or 3 .. XV. OLYRAEAE

**Spikelets 2-flowered, falling entire at maturity, usually with the upper floret fertile and the lower male or barren and in the latter case often much reduced, all alike or differing in size, shape and structure, frequently dorsally compressed:

Spikelets all hermaphrodite, or with male or barren and hermaphrodite spikelets mixed in the same inflorescence:

Spikelets solitary or paired, more or less similar; glumes usually membranous, the lower usually smaller or sometimes suppressed; lower lemma mostly resembling the upper glume in texture; upper lemma papery to very tough and rigid, usually awnless .. XVII. PANICEAE

Spikelets often paired, with 1 sessile and the other pedicelled, those of each pair similar or more often dissimilar, rarely solitary and all alike; glumes as long as the spikelet and enclosing the florets, more or less rigid and firmer than the hyaline or membranous lemmas; upper lemma often awned XVIII. ANDROPOGONEAE

Spikelets unisexual, the male and female spikelets in separate inflorescences or in different parts of the same inflorescence and of different appearance; lemmas hyaline or membranous and thinner than the glumes .. XIX. MAYDEAE

I. BAMBUSEAE

Small undershrubs or herbs; spikelets many-flowered, in terminal spikes or racemes:

Filaments of stamens free .. 1. *Guadua*

Filaments more or less united at the base .. 1a. *Puelia*

Shrubs or trees with usually tall woody culms; spikelets 1-3-flowered, in dense terminal heads or globose whorls; filaments more or less united .. 2. *Oxytenanthera*

II. FESTUCEAE

Leaf-blades lanceolate or ovate-lanceolate, flat, with numerous transverse veins between the main nerves:

Spikelets pedicelled in lax panicles; lemmas awnless .. 3. *Centotheca*

Spikelets subsessile in a long one-sided raceme; lemmas awned from the tip

4. *Streptogyne*

Leaf-blades more or less linear, without transverse veins:

Lemmas 5-9-nerved:

Spikelets arranged in open or contracted panicles, or on opposite sides of the axis of a raceme:

Lemmas rounded on the back or only keeled towards the tips, usually mucronate or awned:

Lemmas lanceolate to broadly oblong; glumes not markedly unequal:

Spikelets subsessile on opposite sides of the axis of a simple spike-like raceme

5. *Brachypodium*

Spikelets pedicelled in panicles:

Lemmas usually awned from the often 2-toothed tip; styles on a hairy appendage of the ovary .. 6. *Bromus*

Lemmas mucronate or awned from the entire tip; styles terminal on the top of the glabrous or hairy ovary .. 7. *Festuca*

Lemmas subulate-lanceolate, awned from the tip ; glumes generally very unequal

8. *Vulpia*
 Lemmas compressed and keeled, awnless, often hairy at the base .. 9. *Poa*
 Spikelets densely imbricate, in short, rarely elongated spikes .. 10. *Aeluropus*
 Lemmas 3-nerved ; spikelets on the stiff spreading branches of a panicle 11. *Cutandia*

III. HORDEAE

- Spikelets solitary, several-flowered 12. *Triticum*
 Spikelets in clusters of 3, 1-flowered 13. *Hordeum*

IV. PAPPOPHOREAE

- Lemmas divided into 9 similar subulate lobes ; fertile floret 1 .. 14. *Enneapogon*
 Lemmas divided into 4 thin lobes, alternating with 5 straight awns ; fertile florets 3-5
 15. *Schmidtia*

V. ARUNDINEAE

- Only West African genus 16. *Phragmites*

VI. ERAGROSTAE

- Spikelets pedicelled in open or contracted, sometimes spike-like, panicles :
 Lemmas toothed or lobed and 3-awned 17. *Triraphis*
 Lemmas entire, awnless, mucronate or shortly 1-awned :
 Lemmas gradually tapering into a rough bristle ; keels of paleas broadly winged ;
 stamen 1 18. *Elytrophorus*
 Lemmas awnless ; keels of paleas usually wingless ; stamens 3 or 2 19. *Eragrostis*
 Spikelets sessile or very short-pedicelled in 2-rowed secund spikes or spike-like racemes :
 Spikes solitary and terminal on the culms ; lemmas awned .. 20. *Tripogon*
 Spikes or racemes digitate or scattered, never solitary :
 Spikes or racemes arranged on an elongated axis ; lemmas mostly emarginate
 or lobed :
 Florets conspicuously exserted from the glumes :
 Spikelets strongly laterally compressed and keeled, falling entire 21. *Desmostachya*
 Spikelets terete or not strongly compressed and keeled, breaking up at maturity
 between the florets :
 Spikelets large, subterete, in loose racemes, often dark-coloured 22. *Diplachne*
 Spikelets small, compressed, in dense racemes or spikes, usually pale
 23. *Leptochloa*
 Florets not exserted from the glumes :
 Racemes not deciduous ; lemmas mucronate or awned .. 24. *Trichoneura*
 Racemes finally deciduous ; lemmas obscurely mucronulate .. 25. *Dinebra*
 Spikes or racemes digitate or subdigitate :
 Glumes strongly keeled ; grain not hollowed out :
 Spikes terminating with a spikelet ; glumes and lemmas emucronate 26. *Eleusine*
 Spikes terminating with a sharp point ; upper glume and lemmas mucronate or
 shortly awned 27. *Dactyloctenium*
 Glumes not keeled ; grain deeply hollowed out ; lemmas awnless 28. *Coelachyrum*

VII. CHLORIDEAE

- Spikelets with 1 (rarely more) fertile and 1 or more imperfect florets above or below the
 fertile :
 Fertile floret with 2 imperfect florets below and 2 or more above it ; upper glume
 with a stiff bristle from the back ; spikes mostly solitary .. 29. *Ctenium*
 Fertile floret with imperfect florets only above it :
 Lemmas narrow, glabrous or scaberulous, with a short awn from the notched or sub-
 entire tips ; spikes elongated, solitary 30. *Enteropogon*
 Lemmas usually widened upwards or if narrow then the spikes digitate :
 Spikes 1 to 3 ; fertile florets 2 or more 31. *Tetrapogon*
 Spikes usually 4 or more, digitate ; fertile floret 1 :
 Glumes unequal, the lower shorter than the florets 32. *Chloris*
 Glumes equal or nearly so, as long as or slightly longer than the florets
 33. *Bracteola*
 Spikelets with 1 fertile floret and no imperfect florets :
 Spikelets awnless or very shortly aristate :
 Glumes much compressed and both keeled :
 Glumes longer than the floret and enclosing it ; spikes solitary in the West African
 species 34. *Brachyachne*
 Glumes shorter than the floret ; spikes digitate 35. *Cynodon*
 Lower glume boat-shaped or much-reduced or suppressed ; upper glume with a
 flat back :

- Axis of spike continuous and tough, flattened, lower glume as long as or slightly longer than the upper 36. *Microchloa*
 Axis of spike very fragile; spikelets more or less sunken in hollows in the axis; lower glume much-reduced or absent 37. *Lepturella*
 Spikelets with long flexuous awns; spikes digitate 38. *Schoenefeldia*

VIII. SPOROBOLAEAE

- Only West African genus 39. *Sporobolus*

IX. AVENEAE

- Panicle very dense and spike-like; lemmas awnless, mucronate or minutely awned from close to the tip 40. *Koeleria*
 Panicle loose or contracted, but not spike-like; lemmas awned:
 Lemmas awned from the base of the 2-lobed tip:
 Florets 3 to many 41. *Danthonia*
 Florets 2 42. *Pentaschistis*
 Lemmas awned from the back:
 Awns flexuous, very long, very fine upwards, and becoming entangled and closely coiled with the awns from other florets; spikelets large, 16-28 mm. long 43. *Streblochaete*
 Awns straight or geniculate, not entangled:
 Perennials; spikelets 2-6-flowered; rhachilla more or less hairy:
 Spikelets large (8-20 mm. long), usually green; lemmas 5-11-nerved, bifid at the tip; awn long, from the middle or above the middle of the back of the lemma 44. *Helictotrichon*
 Spikelets small (up to 9 mm. long), often variegated with purple and golden-yellow; lemmas 4-5-nerved, 2-lobed, 4-toothed or truncate at the tip; awn from the base or up to the middle of the back 45. *Deschampsia*
 Annuals; spikelets 2-flowered; rhachilla glabrous; lemmas 2-toothed at the apex 46. *Aira*

X. AGROSTAEAE

- Glumes awnless:
 Spikelets arranged in open or contracted, sometimes spike-like, panicles:
 Glumes 1-3-nerved; lemma hyaline at maturity, truncate or denticulate-truncate 47. *Agrostis*
 Glumes 5-nerved; lemma indurated and rigid at maturity, 2-toothed at the apex 48. *Hypseochloa*
 Spikelets arranged in compact heads or false spikes:
 Glumes shorter than the floret 49. *Heleochoa*
 Glumes longer than the floret and completely enclosing it 50. *Alopecurus*
 Glumes awned from the notched or lobed tips; panicles more or less spiciform 51. *Polypogon*

XI. STIPEAE

- Awn simple; ligule membranous 52. *Stipa*
 Awn divided into 3 branches; ligule a fringe of hairs 53. *Aristida*

XII. ZOISIEAE

- Glumes awnless, the upper or both mucronate:
 Spikelets in sessile deciduous clusters of 2 to 5; lower glume minute or suppressed 54. *Tragus*
 Spikelets in pairs or solitary on a flattened branch and deciduous with it; lower glume well-developed 55. *Latipes*
 Glumes long and finely awned, smooth; spikelets solitary 56. *Perotis*

XIII. ORYZEAE

- Spikelets with 2 reduced sterile lemmas at the base of the fertile floret; fertile lemma coriaceous; stamens 6 57. *Oryza*
 Spikelets without sterile lemmas; fertile lemma papery; stamens 6-3 58. *Leersia*

XIV. PHAREAE

- Only West African genus 59. *Leptaspis*

XV. OLYREAE

- Only West African genus 60. *Olyra*

XVI. ARUNDINELLEAE

- Lemma of the upper floret usually hairy, or if glabrous then quite smooth; spikelets brownish or greenish :
 Spikelets solitary or paired, rarely in threes and then with the keels of the palea of the upper floret bearing appendages or with the lower glume only half the length of the spikelet :
 Lemma of the upper floret evenly pubescent or pilose, very rarely glabrous, shortly 2-lobed or entire at the apex, the lobes acute or obtuse. 61. *Loudetia*
 Lemma of the upper floret transversely bearded or with a tuft of hairs near each margin, deeply 2-fid :
 Stamens 2; keels of the palea of the upper floret without appendages; lemma of the upper floret with a tuft of hairs near each margin; culms weak; leaf-blades short, linear to ovate 62. *Trichopteryx*
 Stamens 3; keels of the palea with wing- or knob-like appendages; lemma of the upper floret transversely bearded; culms stout; leaf blades linear, elongated 63. *Danthoniopsis*
 Spikelets sessile or shortly pedicelled in threes at the tips of the branches; lower glume over half the length of the spikelet 64. *Tristachya*
 Lemma of the upper floret scabrid or scaberulous; spikelets greyish-green or purplish-green 65. *Arundinella*

XVII. PANICEAE

- *Spikelets falling entire and singly, not subtended by bristles, or if so then the bristles persisting after the spikelets have fallen :
 †Upper glume and lower lemma usually entire at their tips (except in *Oplismenus*), awnless or awned from the tip :
 Both florets fertile or the lower male and then with its lemma hardened and similar to the upper :
 Spikelets arranged in panicles 66. *Isachne*
 Spikelets arranged in short one-sided spikes with a pungent rhachis 67. *Heteranthoecia*
 Upper floret alone fertile; lemma of lower floret usually resembling the upper glume and not hardened :
 Spikelets arranged in more or less open panicles or with the panicles contracted and spike-like :
 Spikelets not subtended by bristle-like branches :
 Spikelets arranged in open or contracted panicles :
 Spikelets not or only slightly gibbous :
 Fertile floret without lateral basal appendages or scars 68. *Panicum*
 Fertile floret with lateral basal appendages or scars 69. *Ichnanthus*
 Spikelets distinctly gibbous and laterally much-compressed 70. *Cyrtococcum*
 Spikelets usually arranged in cylindrical spike-like panicles 71. *Saccolipsis*
 Spikelets subtended by 1 to many bristle-like branches 72. *Setaria*
 Spikelets arranged in one-sided spikes or spike-like racemes; spikes or racemes usually digitate or somewhat distant along a short or long rhachis, rarely solitary :
 Lemma of the upper floret more or less crustaceous or coriaceous, usually with narrow inrolled margins and exposing much of the palea :
 Spikelets dorsally compressed or subterete, the glumes and lower lemma rounded on the back or only keeled at the tip :
 Lower glume and lowest internode of the rhachilla *not* forming a swollen callus at the base of the spikelet :
 Lower glume (when present) turned away from the rhachis of the raceme or spike, the back of the upper lemma facing it :
 Lower glume developed, although sometimes small :
 Spikelets *not* sunken in hollows in a thickened corky rhachis :
 Glumes and lemmas with laterally compressed thickened apices 73. *Acroceras*
 Glumes and lemmas not as above :
 Leaf-blades transversely veined, broad, ovate or ovate-oblong 74. *Commelinidium*
 Leaves not transversely veined :
 Glumes acuminate or awned, rarely only acute; upper lemma *not* mucronate :
 Culms erect or suberect; leaf-blades linear; racemes dense 75. *Echinochloa*
 Culms creeping and ascending; leaf-blades short, lanceolate to ovate; racemes loose to moderately dense 76. *Oplismenus*
 Glumes awnless, if acuminate then with the upper lemma mucronate :
 Upper lemma acute, not mucronate 77. *Paspalidium*
 Upper lemma obtuse, mucronate or very shortly awned 78. *Urochloa*

Spikelets sunken in hollows in a thickened corky rachis, the latter dis-articulating at maturity with the spikelets attached 79. *Stenotaphrum*
 Lower glume usually absent; spikelets plano-convex .. 80. *Paspalum*
 Lower glume turned towards the rachis, the back of the upper lemma turned away from it :

Racemes scattered along a short or long axis; lower glume present

81. *Brachiaria*
 Racemes digitate or subdigitate; lower glume absent .. 82. *Axonopus*
 Lower glume and lowest internode of the rachilla forming a swollen callus at the base of the spikelet; upper lemma mucronate or shortly awned

83. *Eriochloa*

Spikelets laterally compressed :

Spikelets lanceolate; lower glume 5-nerved; upper glume lanceolate, 5-nerved, hairy with stiff tubercle-based hairs .. 84. *Chloachne*

Spikelets obliquely ovate; lower glume 3-nerved; upper glume boat-shaped, gibbous towards the base, 7-nerved, with rows of glands or hooked hairs or bristles between the nerves .. 85. *Pseudechinolaena*

Lemma of the upper floret thinly cartilaginous, usually with flat thin margins covering much of the palea :

Spikelets awned or with the upper lemma mucronate :

Upper glume and lower lemma with fine long entangled awns. . 86. *Acritochaete*
 Upper glume and lower lemma awnless; upper lemma awned or mucronate

87. *Alloteropsis*

Spikelets awnless; upper lemma obtuse .. 88. *Digitaria*

†† Upper glume and lower lemma usually 2-lobed or emarginate at their tips, usually awned or mucronate from the sinus :

Upper glume more or less gibbous on the back, usually with a distinct internode between it and the lower glume; spikelets often silky-villous 89. *Rhynchelytrum*

Upper glume more or less straight on the back, without a distinct internode between it and the lower glume; spikelets usually glabrous or nearly so, at least in the West African species :

Upper glume narrower than the lower lemma, 5-nerved; lemma and palea of upper floret thinly crustaceous .. 90. *Tricholaena*

Upper glume wider than the lower lemma, usually 7-nerved; lemma and palea of upper floret thinly chartaceous .. 91. *Melinis*

*Spikelets falling in clusters and with or without an involucre of bristles, or if falling singly then surrounded by an involucre of bristles or subtended by 1 to several bristles and falling with the bristles :

Spikelets in clusters, not surrounded or subtended by bristles; lower glume indurated 92. *Antheophora*

Spikelets surrounded or subtended by 1 to many bristles; lower glume not indurated :

Bristles solitary below each spikelet :

Racemes loosely spiculate; branches continuous with the spikelets and disarticulating from the rachis at maturity .. 93. *Paratheria*

Racemes densely spiculate; branches very short, persistent .. 94. *Beckeropsis*

Bristles few to many, forming an involucre around the solitary or clustered spikelets :

Bristles free to the base, fine to very fine .. 95. *Pennisetum*

Bristles connate at the base or to beyond the middle, rigid or spinous 96. *Cenchrus*

XVIII. ANDROPOGONEAE

*Internodes of the rachis and pedicels slender, filiform or linear, rarely thickened upwards and then with the upper lemma awned and the pedicelled spikelets male or barren :

Spikelets of each pair alike in sex and shape, or if different in sex, then the pedicelled ♀, usually enveloped by long silky hairs from the base :

Spikelets all pedicelled; rachis of racemes continuous and tough; panicles spike-like, whitish .. 97. *Imperata*

Spikelets paired, with 1 sessile and the other pedicelled; rachis of racemes fragile :

Panicles narrow, fulvous to rufous; glumes coriaceous or chartaceous; spikelets awnless .. 98. *Eriochrysis*

Panicles usually large and broad, silvery or purplish; glumes membranous or only chartaceous or coriaceous at the base; spikelets awned or awnless

99. *Saccharum*

Spikelets of each pair different in sex and usually also in shape and size, the pedicelled ♀ or barren, or if all are similar then the spikelets solitary or with only the pedicel of the pedicelled spikelets present :

Racemes arranged in usually large compound panicles, the racemes not supported by leaf-like spathes :

Spikelets dorsally compressed; the lower glume more or less flattened on the back .. 100. *Sorghum*

- Spikelets laterally compressed or terete; lower glume rounded on the back:
 Racemes reduced to 1 sessile and 2 pedicelled spikelets... 101. *Chrysopogon*
 Racemes composed of many pairs of spikelets... 102. *Vetiveria*
 Racemes usually supported by spathes, or if not, then not forming large panicles:
 Fertile lemma awned from the tip or the sinus of the 2-toothed tip, rarely awnless:
 Column of awn glabrous; margins of lower glume of fertile spikelets inflexed and the glume therefore sharply 2-keeled, or if with the keels rounded, then the back of the glume depressed between the keels; callus usually short and obtuse:
 Awn forming a continuation of the narrow fertile lemma:
 Racemes digitate or racemously arranged on a common axis:
 Sessile spikelets of all the pairs hermaphrodite and awned 103. *Bothriochloa*
 Sessile spikelets of the lowest 1 to 3 pairs male or barren and awnless:
 Racemes not nodding; joints and pedicels solid; anthers from all spikelets alike... 104. *Dichanthium*
 Racemes nodding; joints and pedicels hyaline and balsamiferous between the thickened margins; anthers of the sessile spikelets much smaller than those of the pedicelled spikelets... 105. *Euclasta*
 Racemes solitary at the ends of the culms and their branches 106. *Eremopogon*
 Awn from the sinus of the 2-toothed or 2-fid fertile lemma:
 Racemes solitary at the ends of the culms and their branches:
 Pedicelled spikelets usually smaller than the sessile; upper glume awnless 107. *Schizachyrium*
 Pedicelled spikelets very much larger than the sessile; upper glume awned 108. *Dictomis*
 Racemes paired or digitate, very rarely solitary and then terminal on the simple culms:
 Racemes paired or digitate at the ends of simple or branched culms, rarely solitary or in a spathate false panicle; not aromatic... 109. *Andropogon*
 Racemes paired, each pair supported by a spathe and gathered into often large branched false panicles; aromatic grasses... 110. *Cymbopogon*
 Column of awn hairy or glabrous; margins of lower glume of fertile spikelets involute, keelless or only 2-keeled at the tip, the lower glume therefore with rounded sides; callus often elongated and acute:
 Awn from the sinus of the 2-toothed fertile lemma:
 Racemes paired; column of awn hairy:
 Racemes with the lowest 3 to 9 pairs of spikelets persistent, ♂ or neuter, awnless; pedicelled spikelets large, broad and flat, imbricate... 111. *Diheteropogon*
 Racemes with all pairs heterogamous and at length deciduous, or with the lowest 1 to 2 pairs persistent, ♂ or neuter and awnless; pedicelled spikelets narrower, not imbricate... 112. *Hyparrhenia*
 Racemes solitary at the ends of the culms and their branches, or in more or less compound panicles; column of awn glabrous:
 Spikelets paired; racemes composed of 1 to many pairs of spikelets:
 Sessile spikelets numerous, imbricate; joints of rhachis short; racemes partially enclosed in large coloured boat-shaped spathes 113. *Monocymbium*
 Sessile spikelets few, loose; joints of rhachis elongated; racemes laterally or terminally exserted from the narrow spathes... 114. *Anadelpia*
 Spikelets solitary at the tips of the branches of a spathate panicle 115. *Monium*
 Awn forming a continuation of the narrow fertile lemma, hairy:
 Racemes composed of more than 3 pairs of spikelets and without a false involucre of sterile spikelets at the base:
 Spikelets paired, all pedicelled, one of each pair awned; rhachis of racemes tough... 116. *Trachypogon*
 Spikelets paired with 1 sessile and the other pedicelled, the sessile spikelets in the lower part of the racemes awnless; rhachis of racemes fragile above the sterile spikelets:
 Racemes paired... 117. *Elymandra*
 Racemes solitary... 118. *Heteropogon*
 Racemes solitary, composed of 2 pairs of similar sterile spikelets forming a false involucre around a sessile fertile awned spikelet and 2 pedicelled sterile awnless spikelets, each raceme supported by a leaf-like spathe... 119. *Themeda*
 Fertile lemma awned from low down on the back; dwarf grasses with short lanceolate to ovate leaf-blades... 120. *Arthraxon*
 **Internodes of rhachis and pedicels more or less stout, 3-angled or rounded, thickened upwards or more or less widened and flattened; fertile florets awnless or if awned then with the spikelets similar in sex and the lower floret male:
 Lemma of fertile floret awned:
 Pedicelled spikelets well-developed:
 Racemes paired or digitate... 121. *Ischaemum*

- Racemes, solitary 122. *Sehima*
 Pedicelled spikelets reduced to the narrow curved pedicel; lower glume transversely rugose 123. *Thelepogon*
 Lemma of fertile floret awnless:
 Lower glume produced into a long flattened tail; spikelets glabrous, similar 124. *Vossia*
 Lower glume not as above:
 Lower glume of the pedicelled spikelets long-awned 125. *Urelytrum*
 Lower glume of all the spikelets awnless, or rarely with a very short awn:
 Racemes panicle or racemously arranged on a long common axis 126. *Jardinea*
 Racemes solitary at the ends of simple or branched culms:
 Racemes usually more or less villous:
 Spikelets 2-flowered, the lower floret male with a well-developed palea 127. *Lasiurus*
 Spikelets 1-flowered, the lower floret barren and reduced to the lemma 128. *Elionurus*
 Racemes glabrous or rarely sparingly hairy:
 Pedicels free from the internodes of the rhachis:
 Spikelets similar, 2-flowered; pedicels and internodes gaping 129. *Chasmopodium*
 Spikelets dissimilar, the pedicelled usually much reduced or rudimentary; pedicels and internodes not gaping:
 Racemes terminating the culms and their branches, and supported by spathes 130. *Coelorrhachis*
 Racemes terminal and solitary on the simple culms, not spatulate 131. *Rhytachne*
 Pedicels and internodes of the rhachis fused:
 Sessile spikelets globose; lower glume pitted and tubercled 132. *Hackelochloa*
 Sessile spikelets not globose; lower glume smooth:
 Spikelets all alike; racemes much-compressed, tough 133. *Hemarthria*
 Spikelets dissimilar; racemes cylindric, fragile 134. *Rottboellia*

XIX. MAYDEAE

- Male spikelets in large terminal panicles; female spikelets in axillary sheathed "cobs" 135. *Zea*
 Male spikelets in a short solitary raceme projecting from a globose or ovoid ivory-like sheath containing a solitary female spikelet 136. *Coix*

1. **GUADUELLA** Franch. in Bull. Soc. Linn. Par. 676 (1887) (*errore Guadella*)—
 F.T.A. 9: 25 (in key).

Inflorescence terminating the leafy stems:

- Culms erect from a horizontal rhizome, bearing several (6–12) leaves; leaf-sheaths closely ribbed, the lower ones shortly pubescent; ligule oblique; blades broadly oblong or oblong-elliptic, rather abruptly but broadly acuminate, rounded to a very shortly cuneate base and very shortly "petiolate," 10–18 cm. long, 3.5–6 cm. broad, glabrous, with numerous closely parallel nerves; inflorescence terminal, usually overtopping the leaves, simply branched; rhachis shortly pubescent; spikelets linear, up to 12 cm. long; florets imbricate; lower empty glumes keeled, pubescent; flowering glumes shining, coriaceous, ovate, 6–8 mm. long, villous outside at the base, otherwise glabrous, 7-nerved towards the apex 1. *oblonga*
 Culms as above; leaf-blades gradually acuminate, oblong or oblong-lanceolate; flowering glumes shortly pubescent all over 2. *macrostachys*
 Inflorescence terminating a leafless stem, very similar to that of *G. oblonga*; leaves up to 17 cm. long, and 5.5 cm. broad; spikelets 3–5.5 cm. long 3. *Ledermannii*

1. *G. oblonga* Hutch. in Kew Bull. 1936: ined. *Puelia ciliata* A. Chev. Bot. 753, and Rev. Bot. Appl. Agric. Trop. 1934: 137, not of Franch.

Sierra Leone: Bumbuna (Oct.)! Lowoma, in heavy forest shade (Oct.)! Mamaba! Mabould (Oct.)! Yonibana (Nov.)! Gold Forest (Nov.)! Makump (Dec.)! Liberia: Gbanga (Sept.)! Ivory Coast: between Grabo and Taté! Exsicc.—Thomas 3375; 3882; 3888; 4405; 4514; 4813. *Deighton* 53; 452. *Glanville* 68; 68A. Chev. 19758. *Linder* 564.

2. *G. macrostachys* Pilger in Mildbraed, Wiss. Ergebn. Deutsch. Zent.-Afr.-Exped. 1910–11, 2: Bot. 93 (1922). *Microbambus macrostachys* K. Schum. (1897). *G. Zenkeri* Pilger (1902).

S. Nigeria: Obani! Also in Cameroons. Exsicc.—*Talb.* 957.

3. *G. Ledermannii* Pilger in Engl. Bot. Jahrb. 43: 387 (1909).

S. Nigeria: Obani! Also in Cameroons. Exsicc.—*Talb.* 956.

1a. **PUELIA** Franch. in Bull. Soc. Linn. Paris 1: 674 (1887).

Rhizome woody, with thick roots; culms erect, about 40 cm. high; leaf-sheaths strongly nerved, the lowest with much reduced blade, strongly ribbed, pubescent and ciliate; blades oblong-lanceolate, gradually and subobtusely acuminate, about



FIG. 350.—*GUADUELLEA OBLONGA* Hutch. (GRAMINEAE-BAMBUSEAE).
A, rhizome. B, flowering culm. C, portion of spikelet. D, lower glume. E, upper glume.
F, lemma and palea. G, lemma. H and I, palea. J, flower. K, lodicule and two stamens.

15 cm. long and 3.5-4 cm. broad, ciliate near the base; panicle subsessile, dense, short; rhachis hirsute; spikelets about 1 cm. long, ovoid-lanceolate; lemmas strongly nerved *acuminata*

P. acuminata Pilger in Engl. Bot. Jahrb. 30: 125 (1902).

S. Nigeria: Barombi, in forest (Apr.). Kribi (Apr.). Also in Cameroons. Exsicc.—Preuss 277. Dinklage 1035.

2. OXYTENANTHERA Munro in Trans. Linn. Soc. 26: 126 (1868).—F.T.A. 9: 25 (in key).

Tall bamboo-like woody grass; leaf-sheaths overlapping, tight, closely nerved, ciliate upwards; ligule pectinate; blades oblong or oblong-lanceolate, rounded to a contracted base, very acutely acuminate, up to 15 cm. long and 1.5 cm. broad (but on barren shoots sometimes as much as 25 cm. by 4.5 cm.), closely nerved, glabrous; spikelets in dense globose axillary clusters, these sometimes crowded together into a continuous or broken spike-like panicle, narrowly lanceolate, very acutely acuminate, 2-3 cm. long; empty glumes broadly ovate, sharply mucronate, leathery, glabrescent, remainder more lanceolate, loosely pubescent, all closely nerved; stamens 6, united at the base; anthers apiculate *abyssinica*

O. abyssinica Munro l.c. 127; Camus Bambus. 144, t. 90; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 136. *Bambusa abyssinica* Rich. A tall bamboo-like woody grass, up to 30 or even 50 ft. unnamed, flowering branches sometimes in a dense fascicle; clusters of spikelets usually about 2-24 in. diam.

Senegal to Nigeria, and widely distributed in Tropical Africa. (See Appendix).

Note.—Chevalier records the common bamboo, *Bambusa vulgaris* Schrad. to be spontaneous in the forests of Liberia and the Ivory Coast (Chev. Rev. Bot. Appl. Agric. Trop. 1934: 137; see also Johnston, Liberia 2: 668, with photograph).

3. CENTOTHECA Desvaux—F.T.A. 9: 24 (in key).

Spikelets several-flowered, compressed, 0.8-1.5 cm. long, on slender pedicels, arranged in loose panicles, without bristles; leaf-blades broadly lanceolate or ovate-lanceolate, acute or subacute at the apex, mostly rounded and subamplexicaul at the base, 5-12 cm. long, 1.5-3 cm. broad, with about 5 prominent nerves on each side of the midrib and about 5 less prominent between them with distinct transverse nerves

1. *mucronata*
Spikelets few-flowered, smaller, at most 8 mm. long, more or less secund on the branches of a lax panicle, the upper glumes armed with reflexed tubercle-based bristles; leaf-blades lanceolate or oblong-lanceolate, acutely acuminate, somewhat narrowed to or rounded and substem clasping at the base, 6-18 cm. long, 1.5-3 cm. broad, rather unequal-sided, with about 4 prominent lateral nerves on each side of the midrib and 4-5 fainter nerves between with distinct transverse nerves 2. *lappacea*

1. **C. mucronata** O. Ktze. Rev. Gen. Pl. 765 (1891). *C. ouariensis* Hack. ex C.B.Cl. *Poa mucronata* Poir.; P. Beauv. Fl. Owar. 5, t. 4 (1804). *Eragrostis beninensis* Steud. *Leersia disticha* Benth. *Megastachya mucronata* P. Beauv.

S. Nigeria: Opobo (Apr.)! Aguku Distr. I. Ibuzo (Nov.)! Old Calabar (Apr.)! Lagos! Onitsha! Abo! Nun River! Extends to Angola, in East Africa, from Uganda to Portuguese E. Africa, and in Madagascar. Exsicc.—Barter 1776. Vogel 56. Thomas 735; 2013. Jelfraus 32. Zolland 115. Dalz. 1136.

2. **C. lappacea** Desv. in Nuov. Bull. Soc. Philom. 2: 189 (1810); Chev. Bot. 751; Chev. Rev. Bot. Appl. Trop. 1934: 135. Up to 6 ft. high, in shady places, widely distributed by means of the reflexed bristles on the spikelets.

Common from Senegal (Casamance) to S. Nigeria and Fernando Po; also in St. Thomas, through the Cameroons and Ubangi to Angola; widely spread in the eastern tropics and subtropics. (See Appendix).

4. STREPTOGYNE P. Beauv. Agrost. 80, t. 16, fig. 8 (1812).

Perennial; culms erect; leaf-sheaths ciliate upwards, closely nerved; ligule triangular, brownish; leaf-blades lanceolate, tapered to a fine point, narrowed at the base into a false petiole up to 1.5 cm. long, with about 6 main nerves on each side of the midrib and numerous finer nerves and minute cross-nerves, up to 25 cm. long and 3 cm. broad; spikelets about 2.5 cm. long, narrow, 1-4-flowered, erect, overlapping on an erect unilateral spike; axis puberulous, flattened on one side; styles long-exserted, with scabrid branches *gerontogaea*

S. gerontogaea Hook. f. in Thwaites Fl. Ceyl. 5: 301; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 122. *S. crinita* Auct. not of P. Beauv. A very distinctive grass in the forest undergrowth.

Senegal: Casamance. French Guinea. Sierra Leone: various localities! Ivory Coast. Liberia: Peantah (Oct.)! Gold Coast: Amuni, along forest tracks (Dec.)! S. Nigeria: Onitsha! Obani! Lagos! Fernando Po (Dec.)! Extends to Uganda and Portuguese Congo, and in Ceylon. Exsicc.—Se. Elliot 3939; 4389. Lane-Poole 344. Deighton 397; 838. Glanville 58. Dalz. 8420. Thomas 441: 2010; 2381; 2719; 2983; 7822; 7903. Linder 1012. Chipp 53. Cummins 84-164. Barter 1814. Talb. 856. Mann 108. (See Appendix).

5. BRACHYPODIUM Beauv. Agrost. 100 (1812).—F.T.A. 9: 24 (in key).

Culms many-noded, slender; nodes shortly pubescent; leaf-sheaths open, closely nerved; ligule short, submembranous; blades narrowly linear, closely folded, several-nerved, up to 15 cm. long; simple spike-like raceme about 9 cm. long; spikelets 2 cm. long; glumes nearly equal, nearly 1 cm. long, very acute, strongly 5-nerved; lemmas 7-nerved, awned from the top, lanceolate, 1 cm. long *flerum*



FIG. 351.—*OXYTENANTHERA ABYSSINICA* Munro (GRAMINEAE-BAMBUSEAE).
A, part of culm. B, culm-sheath. C, leaf. D, spikelet.



FIG. 352.—*CENTOTHECA LAPPACEA* Desv. (GRAMINEAE-FESTUCEAE).

A, whole plant. B, spikelet. C, lower glume. D, upper glume. E and I, lemmas.
F, palea. G, flower and palea. H, pistil.

B. flexum Nees Fl. Afr. Austr. 456 (1841). *B. sylvaticum* Hook. f. in Journ. Linn. Soc. 6: 23, not of P. Beauv. Culms 2-3 ft. high, slender.

Fernando Po: Clarence Peak, 7,000 ft. Exsicc.—Mann 321.

The specimen quoted is the only one I have seen and is not a particularly good one. If *B. flexum* Nees, a native of S. Africa, be distinct from *B. sylvaticum* P. Beauv., from the Northern Hemisphere, then I think our plant agrees better with the former and not with the latter, as it was determined by J. D. Hooker.

6. BROMUS Dill. ex Linn.—F.T.A. 9: 24 (in key).

Lower glume 1-nerved, 11 mm. long, aristate-acuminate, scabrid on the nerve; upper glume 3-nerved, aristate-acuminate, scabrid; lemma about 2 cm. long, awned, 5-nerved, scabrid on the nerves; culms slender, about 2 m. high; leaf-sheaths retrorse-scabrid; ligule membranous, jagged; blades linear, closely nerved, pilose with weak hairs, 5 mm. broad; panicle very lax and slender, lower branches fasciculate; spikelets few, 3-4 cm. long 1. *scabridus*

Lower glume obscurely 5-nerved, 5 mm. long, subobtusate, glabrous; upper glume with a double keel and 2 nerves on each side, 7 mm. long; lemma 1 cm. long with a scabrid awn 5 mm. long, 7-nerved, bilobed, slightly scabrid upwards; culms about 20 cm. high; leaf-sheaths shortly retrorse-pubescent; ligule membranous, broadly ovate-triangular, setose-jagged; blades scabrid-pubescent; panicle short, lower branches fasciculate; spikelets about 3.5 cm. long 2. *japonicus*

1. *Bromus scabridus* Hook. f. in Journ. Linn. Soc. 7: 231 (1864).

Cameroons Mt.: 7,000-9,000 ft. (Nov.-Feb.)! Exsicc.—Mann 2085. *Migeod* 175. *Dolz* 8352.

2. *B. japonicus* Thunb. Fl. Jap. 51, t. 11 (1784). *B. patulus* Mert. & Koch in Roehl. Deutschl. Fl. 1: 685 (1823); Fl. Brit. Ind. 7: 361.

French Sudan: Central Sahara: Silet, on bank of irrigation ditch, 2,500 ft. (Mar.)! Old World from Europe to Japan. Exsicc.—Chipp 88.

7. FESTUCA Linn. Sp. Pl. 73 (1753).—F.T.A. 9: 162 (in key); Fl. Cap. 7: 719.

Awns as long as or longer than the glumes, scabrid:

Leaf-blades very narrow; culms slender, up to 0.75 m. high, few-noded; sheaths open towards the top, much shorter than the internodes, smooth; ligule a short membranous auricle on each side; blades narrowly linear, up to 20 cm. long, glabrous, the midrib forming a prominent keel below and decurrent down the middle of the sheath; panicle very narrow, up to 25 cm. long, with erect branches; spikelets about 1.3 cm. long without the awns; lower glume 5 mm., second glume 7.5 mm. long, the latter aristate; awns scabrid, 1.5 cm. long 1. *simensis*

Leaf-blades broad (about 1 cm.); culms tall, nodes exserted; sheaths tight but open towards the top; ligule membranous, 4-5 mm. long; blades broadly elongate-linear, gradually tapered to the apex, with several distinct nerves, glabrous or nearly so; panicle slender, lax; spikelets oblong-lanceolate, about 3 cm. long; lower glume lanceolate, shortly aristate, 4 mm. long, with thick midrib and membranous margins; upper glume a little longer and broader, 3-nerved; lower lemma broadly lanceolate, 1 cm. long, 5-nerved, long-awned slightly below the minutely bifid apex 2. *gigantea*

Awns much shorter than the glumes, scabrid; culms fairly stout, stiff and erect, densely leafy at the base, 1-2-noded; sheaths open towards the top, longer than the internodes, the margins membranous upwards; ligule finely jagged, membranous; blades narrowly linear, convolute, scabrid on the nerves above, smooth below, the midrib decurrent on the sheath; panicle narrow and subspiciform, dense, up to 20 cm. long; spikelets about 1.3-1.5 cm. long including the short awns; lower glume broadly oblong-lanceolate, acute, 1-nerved, glabrous, 7 mm. long; second glume oblong-elliptic, 3-nerved, 8 mm. long; lower lemma ovate-elliptic, aristate-acuminate, 1 cm. long, faintly 5-nerved 3. *Schimperiana*

1. *Festuca simensis* Hochst. ex A. Rich. Tent. Fl. Abyss. 2: 433 (1851). Perennial up to 2½ ft. high; spikelets pale green, with long scabrid bristles.

Cameroons Mt.: 7,000 ft. (Dec.)! Fernando Po: 8,500 ft. (Mar.)! Also in Abyssinia and Kenya. Exsicc.—Mann 1473; 2069.

2. *F. gigantea* Vill. Hist. Pl. Dauph. 2: 110; Fl. Prit. Ind. 7: 853. *Bromus giganteus* Linn.

Fernando Po: 8,500 ft. (Mar.)! Also in Europe, N. Asia and Himalaya. Exsicc.—Mann 1462; 1468. (See Appendix).

3. *F. Schimperiana* A. Rich. Tent. Fl. Abyss. 2: 433 (1851). A tufted perennial with narrow stiff panicle; spikelets often tinged with mauve, with short awns.

Cameroons Mt.: 8,000 ft. to the summit, on bare rocky ground (Nov.-Jan.)! Fernando Po: Clarence Peak, 8,500 ft. (Dec.-Mar.)! Also in Abyssinia. Exsicc.—Mann 656; 1349; 1465; 1477; 2072; 2087. *Migeod* 197A. *Mildbr.* 10905; 10909; 10911.

8. VULPIA Gmel.—F.T.A. 9: 24 (in key); Fl. Cap. 7: 723.

Culms very slender, glabrous, 2-3-noded; sheaths glabrous; ligule very short; blades linear, tapered to a very acute point, up to 15 cm. long, 1-2 mm. broad, few-nerved, scabrous or puberulous above; panicle erect and narrow, more or less second 2.5-7 cm. long; rhachis acutely angular; spikelets 8-12 mm. long, 4-7-flowered; glumes

subulate-lanceolate, lower 1-nerved, upper 3-nerved; lemma lanceolate-linear, 5-8 mm. long, faintly 5-nerved; awn as long as the lemma or longer, very slender
bromoides

V. bromoides *S. F. Gray*.—Fl. Cap. 7: 725.

Cameroons Mt.: 7,000-10,000 ft. (Dec.)! Widely distributed in the Mediterranean region and in Europe: also in Abyssinia, Mt. Elgon, S. Africa and Tristan da Cunha.

9. POA Linn. F.T.A. 9: 24 (in key).

Annual a few centimetres high; leaf-sheaths with membranous margins upwards; blades linear, more or less pilose with weak hairs; panicle small; spikelets gaping, 4 mm. long; lower glume nearly half as long as the spikelet, upper a little longer than the lower, green, with membranous margins; lemma 5-nerved 1. *annua*
 Taller, 15 cm. or more high:

Spikelets 5 mm. long; lower glume sub-3-nerved, 3 mm. long, upper 3-25 mm. long; lemma 5-nerved; withered leaf-sheaths persistent; sheaths smooth; ligule broadly ovate-triangular, membranous, 3 mm. long; blades up to 15 cm. long, convolute, scabrid on the margin. 2. *binata*?

Spikelets 3-3 mm. long; lower glume 1-nerved, 1-75 mm. long, scabrid upwards on the keel, margins membranous; upper glume 3-nerved, 2 mm. long, slightly scabrid upwards; lemma 5-nerved, 2 mm. long, glabrous; withered leaf-sheaths persistent; sheaths prominently keeled, glabrous; ligule triangular, membranous, 3 mm. long; blades linear, up to 15 cm. long, contracted at the base, minutely scabrid on both surfaces 3. *leptoclada*?

1. **P. annua** Linn. Sp. Pl. 68.

Cameroons Mt.: 7,500 ft. in grassland (Nov.)! Rare in the tropics but widely distributed in temperate regions. Exsicc.—*Migeod* 218.

2. **P. binata** Nees (?) Fl. Afr. Austr. 378.

Cameroons Mt.: 7,000-9,000 ft. (Nov.-Dec.)! Also in S. Africa and Abyssinia. Exsicc.—*Mann* 2083.

Migeod 173.

For the correct identification of this and the next species it will be necessary to await the complete revision of the genus for the general Flora. Our plant agrees fairly well with the *P. simensis* Hochst. from Abyssinia, which Stapf has marked "cf. *P. binata*."

3. **P. leptoclada** Hochst. ex *A. Rich.* (?) Tent. Fl. Abyss. 2: 422.

Cameroons Mt.: 7000-11,000 ft. (Nov-Apr)! The true species in Abyssinia and East African mountains. Exsicc.—*Mann* 1480; 2071. *Dalziel.* 8351. See note under *P. binata*.

10. AELUROPOUS Trin.—F.T.A. 9: 23 (in key).

Culms procumbent, stoloniferous, wiry and woody; leaf-sheaths overlapping; ligule shortly ciliate; blades spreading, infolded, subulate-lanceolate, pungent-pointed, glabrous, 1.5-3 cm. long, very closely nerved; spikelets in compact ovoid heads or short, rarely elongated, interrupted spikes, villous, with soft hairs *lagopoides*

A. lagopoides Druce in Rep. Bot. Exch. Club Brit. Isl. 1916: 603 (1917). *A. repens* Parl.—Chev. Rev. Bot. Appl. Agric. Trop. 1934: 134. *A. villosus* Trin. ex C. A. Mey. *Dactylis lagopoides* Linn.

Mauritania: N. and N.W. Adrar. Central Sahara: El Golea. Mediterranean to India. Exsicc.—*Chev.* 42013. *Schmidt* 28514.

11. CUTANDIA Willk. in Bot. Zeit. 18: 130 (1860).

Leaf-sheaths tight, with hyaline margins upwards; ligule large, membranous; leaf-blades tapered to a fine point, glabrous except the finely scabridulous nerves; panicle zigzag, embraced for some time by the sheath, usually about 8 cm. long, pale green; spikelets linear-lanceolate, acute, 1 cm. long; glumes slightly unequal, one-third as long as the spikelet *memphitica*

C. memphitica Benth. in Journ. Linn. Soc. 19: 118 (1881); C. Richt. Pl. Europ. 1: 77 (1889); A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 121. Annual about 8-12 in. high, in oases and on banks of canals.

Mauritania. Central Sahara: Adrar; Touat. Tinoulat, near Reggan. Silet, weed in irrigated barley plot, also seen at El Golea (Mar.)! French Sudan: Timbuctu, in gardens. South Europe and North Africa to Western Asia. Exsicc.—*Chipp* 110.

12. TRITICUM Linn.—F.T.A. 9: 25 (in key).

T. vulgare Vill.—Wheat. See Holland, The Useful Plants of Nigeria, 870, and Appendix to this Flora.

13. HORDEUM Linn.—F.T.A. 9: 25 (in key).

H. vulgare Linn. var. *hexastichon* Aitch.—Fl. Brit. Ind. 7: 371. Spikelets in 6 rows.

N. Nigeria: Bornu! Exsicc.—*Thornton*. (See Appendix).

14. ENNEAPOGON Desv.—F.T.A. 9: 22 (in key); Fl. Cap. 7: 654.

Awns plumose towards the base, 5 mm. long; perennial, all parts finely glandular-pubescent; culms ascending, often with a bulbous thickening at the base; nodes villous, mostly a little exserted; sheaths closely nerved; blades narrowly linear, gradually acute, up to 12 cm. long, usually setaceously convolute, closely nerved; panicle spike-like, dense, about 3 cm. long; glumes unequal, lower two-thirds as long as the upper, lower 9-nerved, upper 7-nerved, side-nerves evanescent upwards; lemma villous 1. *brachystachys*

Awns minutely scaberrulous on the margin; perennial, finely glandular pubescent; nodes villous; sheaths closely nerved, softly and shortly pubescent; blades very shortly pubescent, up to 8 cm. long; panicle short, spike-like or triangular in outline, loose, about 3-5 cm. long; glumes unequal, lower two-thirds as long as the upper; lemma densely villous 2. *scaber*

1. *E. brachystachyus* Stapf in Dyer Fl. Cap. 7: 654 (1900); Chev. Rev. Bot. Appl. Agric. Trop. 1934: 132. *Pappophorum senegalense* Steud.

French Sudan: Ausongc (Sept.)! Hoggar Mts., 3,600 ft. (Mar.)! Extends from the Canaries and Cape Verde through North Africa to N.W. India, and in S. Africa. Exsicc.—Hagerup 397. *Meinertzhagen* 224.

2. *E. scaber* Lohm. Pug. 3: 41; Stapf in Dyer, Fl. Cap. 7: 656. *Pappophorum scabrum* Kunth.

French Sudan: Taharaut, 5,900 ft. (Mar.)! N. Africa from Morocco to Eritrea, and in S. Africa. Exsicc.—*Meinertzhagen* 209: 212.

Chevalier records *E. elegans* Stapf from the Adrar des Iforas (*Leclercq* 42692). I have not seen the specimen, which may be *E. scaber*.

15. SCHMIDTIA Steud.—F.T.A. 9: 22 (in key); Fl. Cap. 7: 657.

Culms ascending, sometimes rooting from the lower nodes; leaf-sheaths softly pilose; ligule a rim of dense hairs; blades tapered to a long fine point from a broad base, 10-12 cm. long, 5-8 mm. broad, softly pubescent, with about 8 prominent principal nerves and very close fainter nerves between; panicle narrow, 6-12 cm. long, softly pubescent all over; spikelets about 1 cm. long; lower glume ovate-lanceolate, acute, about 8 mm. long, upper similar and a little longer, both 9-nerved and pubescent with sometimes gland-tipped hairs; lemma broadly obovate, with 5 longish bristles alternating with 4 membranous very acute lobes *pappophoroides*

3. *pappophoroides* Steud. in J. A. Schmidt, Beitr. Fl. Cap. Verd. Ins. 145 (1852); Chev. Rev. Bot. Appl. Agric. Trop. 1934: 132. *Anthoschmidtia quinqueseta* Chev. l.c. not of Fic. & Rendle. An annual, softly pilose all over, with long-pedunculate narrow panicles.

Senegal: Walo! French Sudan. Also in Cape Verde Islands, E. Sudan, Nyasaland and Angola. Exsicc.—*Hudelot* 516.

16. PHRAGMITES Trin.—F.T.A. 9: 18 (in key); Fl. Cap. 7: 540.

A tall grass near water, up to 3 m. high; culms erect, many-noded; leaf-sheaths overlapping one another, tight, the lowest with reduced blades or bladeless; ligule a narrow ciliate rim; blades linear to lanceolate, tapered to a sharp scabrid point, variable in length, up to 4 cm. broad, glaucous below, with very close nerves; panicle up to 0.5 m. long, erect or nodding, closely subtended by the uppermost leaves, the ultimate branches very slender, finely scabrid; spikelets about 1 cm. long, loosely 3-10-flowered, awnless, lowest flower male or abortive, the following hermaphrodite, the uppermost reduced; glumes subequal; callus with very long silky hairs *vulgaris*

- P. vulgaris* Druce List. Brit. Pl. 81 (1908). *Arundo Phragmites* Linn. *A. vulgaris* Lam. *P. communis* Trin.—Fl. Cap. 7: 541. *P. maxima* A. Chev.

Common near water throughout the area; of more or less cosmopolitan distribution. (See Appendix).

17. TRIRAPHIS R. Br. Prodr. 185 (1810).—F.T.A. 9: 22 (in key).

Annual, about 8 cm. high, branched from the base; leaf-sheaths pilose with long weak bulbous-based hairs; blades tapered to a fine setaceous point, 2-4 cm. long; spikelets in a dense spiciform panicle 2-2.5 cm. long and up to 1.5 cm. diam., pedicellate; lemma lobed, 3-awned, long-ciliate, awns fine, bristle-like *Pumilio*

- T. Pumilio* R. Br. in Denh. & Clapp. Voy. Append. 245; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 131. *T. glomerata* A. Camus.

Mauritania: Atar. South of Tanzeurouft. Air; Tasolé. Also in Eastern Sudan, Arabia and Angola to Little Namaqualand. Exsicc.—*Oudney*. (See also Chev. l.c. and Appendix).

18. ELYTROPHORUS P. Beauv.—F.T.A. 9: 23 (in key); Fl. Brit. Ind. 7: 306.

Annual up to about 35 cm. high, erect; leaves linear from a broad base; sheath with membranous margins, glabrous; blades tapered to an acute apex, usually shorter than the longest spike, glabrous; spikes continuous or interrupted, cylindric; spikelets small, in sessile clusters on the pubescent rhachis, with awned glumes subtended by many empty glumes; keels of palea winged *spicatus*

- E. spicatus* A. Camus in Lecomte, Fl. Gen. Indo-Chine 7: 547 (1923). *Dactylis spicata* Willd. (1801). *Elytrophorus articulatus* P. Beauv. Agrost. 67, t. 14, fig. 2 (1812); Chev. Rev. Bot. Appl. Agric. Trop. 1934: 134.

Senegal: Richard Tol, in the plains (Jan.)! Tamboukane (Oct.)! French Sudan: Bura, near water, amongst mud (Sept.)! Macina (Oct.)! Extends to N.E. Trop. Africa and in Tanganyika (sometimes growing in close stands in shallow water); also in Tropical Asia and Australia. Exsicc.—*Roger* 30. Chev. 2883; 24892. *Hagerup* 407.

19. ERAGROSTIS Beauv.—Fl. Cap. 7: 594. (See Appendix).

(By C. E. HUBBARD.)

*Spikelets 0.8-2.5 (rarely -3) mm. wide, linear to lanceolate or oblong; lemmas 0.7-2.5 mm. long; margins of leaf-blades eglandular:

†Spikelets breaking up from the apex downwards; rhachilla jointed and readily disarticulating between the florets; lemma and palea falling together and enclosing the grain:



FIG. 353.—*ERAGROSTIS ASPERA* Nees (GRAMINEAE-ERAGROSTEA).

A, ligule. B, spikelet. C, portion of spikelet showing axis. D, lower glume. E, upper glume. F, lemma. G, side view of palea. H, grain.

Keels of paleas ciliate with spreading hairs :

Panicle narrow, spike-like and dense, or more or less lobed or interrupted ; spikelets in dense clusters, broadly ovate or broadly oblong, 1.5–2 mm. wide ; leaf-sheaths loosely bearded at the mouth ; blades flat or rolled, 1–4 mm. wide ; panicle 3–20 cm. long ; spikelets 2–4 mm. long, loosely 6–12-flowered, pale green or purplish ; lemmas oblong, very obtuse or truncate, 1–1.3 mm. long, glabrous ; anthers 0.3–0.4 mm. long ; grain ovoid, 0.5 mm. long .. 1. *ciliaris*

Panicle ovate or oblong, loose and open or contracted, but not spike-like ; spikelets scattered or contiguous, oblong, up to 1.5 mm. wide ; leaf-sheaths bearded at the mouth ; blades flat or rolled, 1–3 mm. wide, glabrous ; panicle 3–13 cm. long, 1–3.5 cm. wide ; spikelets 1–4 mm. long, loosely 3–9-flowered, green or purplish ; lemmas oblong, very obtuse or truncate, 0.8–1.2 mm. long, glabrous ; anthers 0.2 mm. long ; grain ovoid-ellipsoid, 0.4–0.6 mm. long .. 2. *tenella*

Keels of paleas smooth or scaberulous :

Spikelets 1–2.5 mm. long, oblong, 3–10-flowered, on very short pedicels ; panicle usually narrow, 1–10 cm. wide ;

Paleas scaberulous on the keels ; glumes lanceolate to lanceolate-oblong, acute or obtuse ; leaf-blades flat, up to 4 mm. wide ; panicle contracted or open ; 10–40 cm. long ; spikelets 0.8–1 mm. wide, pale green or tinged with purple ; lemmas oblong, very obtuse or truncate, 0.7–1 mm. long, glabrous ; anthers 2, 0.15–0.2 mm. long ; grain ellipsoid, 0.4–0.5 mm. long .. 3. *diplachnoides*

Paleas smooth on the keels ; glumes oblong, obtuse, truncate or emarginate ; leaf-blades flat, up to 6 mm. wide ; panicle contracted or open, 10–45 cm. long ; spikelets 0.8–1 mm. wide, pale green or purplish ; lemmas oblong, very obtuse, 0.8–1 mm. long, glabrous ; anthers 2, 0.3–0.4 mm. long ; grain elliptic-oblong, about 0.5 mm. long .. 4. *namaquensis*

Spikelets 4–10 mm. long, linear, 6–22-flowered, on long fine pedicels ; panicle broad, up to 35 cm. wide ; leaf-sheaths bearded at the mouth ; blades flat, 4–12 mm. wide ; panicle broadly ovate to broadly obovate-oblong, very loose, 10–65 cm. long ; spikelets 1–1.5 mm. wide, scattered, pale or purplish ; lemmas ovate-oblong, truncate, 1.3–1.7 mm. long, glabrous ; paleas scabrid on the keels ; anthers up to 0.3 mm. long ; grain subglobose, up to 0.5 mm. long

5. *aspera*

†Spikelets breaking up from the base upwards ; rhachilla tough and persistent or only articulated at the base ; lemma and palea separately deciduous and not enclosing the grain ; keels of palea eciliate ; spikelets over 2.5 mm. long :

‡Lemmas contiguous, with usually incurved margins, lanceolate to oblong or narrowly ovate in side view :

¶Spikelets mostly less than 1.5 mm. wide, or if up to 2 mm. wide then plants annual ; anthers 0.2–0.6 mm. long :

Spikelets blackish- or dark purplish-grey ; leaf-sheaths bearded at the mouth ; blades flat, up to 4 mm. wide ; panicle very loose, open, up to 35 cm. long and 15 cm. wide ; spikelets scattered, oblong or lanceolate-oblong, 3–5 mm. long, 1.2–2 mm. wide, loosely 4–10-flowered ; glumes up to 2 mm. long ; lemmas narrowly ovate, acute, 1.5–2 mm. long, glabrous ; paleas scaberulous on the keels, persisting after the lemmas have fallen ; anthers 0.5 mm. long ; grain subglobose, 0.5–0.7 mm. long .. 6. *macilenta*

Spikelets pallid, green, purple or greenish-grey :

Spikelets 1.5–2 mm. wide ; glumes 1.5–2.5 mm. long, linear-lanceolate ; leaves glabrous or slightly hairy at the mouth of the sheaths ; blades flat or rolled, up to 4 mm. wide ; panicle oblong, loose to moderately dense, 5–25 cm. long, 1.5–5 cm. wide ; spikelets lanceolate-oblong to oblong, 3–8 mm. long, 7–15-flowered, purplish ; lemmas lanceolate, subacute, 1.5–2 mm. long, glabrous ; paleas persisting after the lemmas have fallen, with scabrid keels ; anthers 0.3–0.4 mm. long ; grain subglobose, 0.4 mm. long .. 7. *densa*

Spikelets 0.8–1.5 mm. wide ; glumes 0.3–1.5 mm. long :

Perennial, with thick roots clothed with a dense sheath of hairs ; culms 60–130 cm. high ; leaf-sheaths bearded at the mouth ; blades stiff, up to 4 mm. wide, glabrous ; panicle mostly linear to lanceolate, dense and contracted, or somewhat open, 15–40 cm. long, 2–12 cm. wide ; spikelets linear, 5–18 mm. long, 1–1.4 mm. wide, 10–30-flowered, pallid to greyish-green ; lemmas oblong-lanceolate, subacute, 1.4–2 mm. long, glabrous ; paleas persisting after the lemmas have fallen, scaberulous on the keels ; anthers 0.3–0.6 mm. long ; grain oblong, 0.8 mm. long .. 8. *linearis*

Annuals, with fine thin roots, without a protecting sheath of hairs ; culms up to 70 cm. high :

Panicle usually dense and spike-like ; leaf-sheaths bearded at the mouth ; blades short, flat or rolled, up to 2.5 mm. wide ; panicle narrowly oblong to ovate, 1–20 cm. long ; spikelets dense, linear, 5–10 mm. long, 1 mm. wide, 14–20-flowered, pale green ; lemmas lanceolate to lanceolate-oblong,

subacute, 1.5–2 mm. long, glabrous; paleas persisting after the lemmas have fallen, scaberulous on the keels; anthers 0.2 mm. long; grain oblong, 0.7 mm. long 9. *aegyptiaca*

Panicle usually open and loose, or with the spikelets contracted along the branches:

Grain oblong or elliptic-oblong in outline, 0.5–1 mm. long:

Spikelets 6–16 mm. long, 10–30-flowered; leaf-sheaths bearded at the mouth; blades rolled, stiff, up to 9 cm. long, 1–2 mm. wide, glabrous; panicle ovate to oblong, 4–16 cm. long, up to 8 cm. wide; spikelets appressed to the branches, linear, 0.8–1.3 mm. wide, whitish or pale green; lemmas lanceolate, acute, 1.5–2 mm. long, glabrous; paleas persisting after the lemmas have fallen, scaberulous on the keels; anthers 0.2–0.3 mm. long 10. *albida*

Spikelets 3–7 mm. long, 4–14-flowered; leaf-sheaths bearded at the mouth; blades up to 20 cm. long, flat or rolled, 1–4 mm. wide, glabrous; panicle ovate-oblong to oblong, 3–30 cm. long, up to 10 cm. wide, usually hairy at the lowest node; spikelets loosely scattered, linear, 1–1.3 mm. wide, pallid, purplish or grey; lemmas lanceolate-oblong to narrowly ovate, subacute or obtuse, 1.4–2 mm. long, glabrous; paleas mostly deciduous at the same time as the lemmas or soon after, scaberulous on the keels; anthers 0.2 mm. long 11. *pilosa*

Grain broadly elliptic to orbicular in outline, 0.4–0.6 mm. long; leaf-sheaths more or less hairy at the mouth; blades up to 15 cm. or more long, rolled or flat, 1–3 mm. wide; panicle ovate to elliptic, 5–25 cm. long, 3–8 cm. wide; spikelets scattered or clustered, linear to oblong, 4–10 mm. long, 1–1.5 mm. wide, closely 10–40-flowered, pallid, grey, or purplish; lemmas narrowly ovate, acute or subobtusate, 1–1.5 mm. long, glabrous; paleas usually deciduous at the same time as or soon after the lemmas, scaberulous on the keel; anthers 0.2 mm. long 12. *Cambessediana*

¶¶ Spikelets mostly 2–2.5 mm. wide (rarely to 3 mm. and then with the lemmas spreading); plants perennial; anthers 0.7–1.4 mm. long; leaf-sheaths bearded at the mouth or glabrous; blades stiff, erect, flat or rolled, 2–4 mm. wide; panicle ovate or oblong, open or contracted, 5–30 cm. long; spikelets linear-oblong to oblong, 5–20 mm. long, usually greyish, rarely pallid or purple, 8–30-flowered; lemmas oblong or lanceolate-oblong, acute to subobtusate, 1.8–2.5 mm. long, glabrous; paleas deciduous, scabrid or minutely ciliate on the keels; grain oblong, 0.7–1 mm. long 13. *gangetica*

‡‡ Lemmas closely imbricate, with flat margins, ovate to broadly ovate in side-view; paleas persisting after the lemmas have fallen:

Lemmas obtuse; spikelets on long fine pedicels, 8–50 mm. long, 10–100-flowered; annual; leaf-blades flat or rolled, up to 7 mm. wide; panicle ovate to elliptic, very loose and open, nodding, 5–50 cm. long, 5–30 cm. wide; spikelets scattered, linear, 1.6–2 mm. wide, often curved, pallid or purplish; lemmas 1.6–2 mm. long, glabrous; paleas scabrid on the keels; anthers 0.2 mm. long; grain globose, 0.5 mm. long 14. *tremula*

Lemmas acute; spikelets short-pedicelled, 6–26 mm. long, 12–60-flowered; perennial; leaf-blades stiff, flat or rolled, up to 6 mm. wide; panicles elliptic, open and loose, 5–35 cm. long, 5–15 cm. wide; spikelets more or less appressed to the branches, linear, straight, 2–2.5 mm. wide, purplish or purplish-grey; lemmas ovate, 2–2.5 mm. long, glabrous; paleas minutely ciliate on the narrowly winged keels; anthers 0.3 mm. long; grain subglobose, 0.5–0.7 mm. long 15. *squamata*

** Spikelets 3–5 mm. wide, oblong to ovate or elliptic, or if less than 3 mm. wide then ovate in outline, or with lemmas over 2.5 mm. long, or with glands on the margins of the leaf-blades:

† Florets all similar in colour and sex, ♂; spikelets oblong to ovate or elliptic-oblong, not twisted:

‡ Keels of paleas not or only very narrowly winged:

¶ Glumes and lemmas quite glabrous:

Lemmas glandular on the keel and usually also glandular on the margins of the leaf-blades; leaf-sheaths usually bearded at the mouth; blades flat, 3–11 mm. wide; panicle ovate to oblong, open or contracted, loose or dense, 5–25 cm. long, 2–12 cm. wide; spikelets narrowly oblong to oblong or ovate-oblong, 4–25 mm. long, 2–4 mm. wide, few- to 50-flowered, leaden-grey, becoming pallid; lemmas ovate or ovate-oblong, obtuse, 2–2.8 mm. long; paleas persisting after the lemmas have fallen, scabrid or ciliate on the keels; anthers up to 0.5 mm. long; grain globose, up to 0.6 mm. long 16. *cilianensis*

Lemmas and leaf-blades not glandular:

Panicle linear, 0.7–1 cm. wide, racemose in the upper part; culms more or less hairy; leaf-blades up to 20 cm. long and 2 mm. wide, hairy; panicle 8–12 cm.

long, erect, contracted, interrupted; branches 1-4-spiculate; spikelets oblong, 7-18 mm. long, 3.5-4.5 mm. wide, 8-26-flowered, yellowish-green; lemmas narrowly ovate, acute, 3-3.2 mm. long; paleas deciduous, scaberulous on the narrowly winged keels; anthers 1-1.3 mm. long .. 17. *Pobeguini*

Panicle ovate to elliptic or oblong, 1.5-25 cm. wide:

Leaf-blades spreading horizontally or becoming reflexed, 0.5-6 cm. long, 0.5-2 mm. wide, flat or rolled; panicle ovate to oblong, loose or somewhat contracted, 4.5-8.5 cm. long, 1.5-3.5 cm. wide; spikelets loosely scattered, ovate-oblong to oblong, obtuse, 4-7 mm. long, 2.5-4 mm. wide, 6-12-flowered, olive-green; lemmas broadly ovate-oblong to broadly elliptic-ovate, obtuse or subacute, 2-2.3 mm. long; paleas deciduous, with the keels narrowly winged and ciliate; anthers 1-1.5 mm. long; grain elliptic, 1 mm. long .. 18. *Volkensii*

Leaf-blades mostly erect or sometimes obliquely spreading:

Spikelets long-pedicelled in large open loose panicles; perennial; leaf-blades up to 30 cm. long and 6 mm. wide, rolled, glabrous; panicle up to 35 cm. long and 25 cm. wide; spikelets scattered, oblong, 5-12 mm. long, 3-3.5 mm. wide, 12-30-flowered, grey; lemmas obliquely ovate or ovate-oblong, acute, 2.3 mm. long; paleas deciduous, with scaberulous keels; anthers 1 mm. long; grain 1 mm. long .. 19. *chalarothyrsos*

Spikelets short-pedicelled in often contracted smaller panicles; annual:

Lemmas 3 mm. long; anthers 1 mm. long; leaf-blades up to 15 cm. long and 5 mm. wide, flat, glabrous; panicle moderately dense, up to 20 cm. long and 7 cm. wide; spikelets oblong, 6-14 mm. long, 2.5-3.5 mm. wide, 8-20-flowered, straw-coloured and tinged with purple; lemmas lanceolate to lanceolate-oblong, subacute; paleas deciduous, with scaberulous keels .. 20. *Barteri*

Lemmas 1.3-2 mm. long; anthers 0.2-0.5 mm. long:

Culms usually simple; spikelets 4-12 mm. long, 3-3.5 mm. wide, 20-50-flowered, green or reddish-purple; leaf-blades 3-10 cm. long, 2-5 mm. wide, flat; panicle lanceolate to ovate or oblong, loose or contracted, 5-14 cm. long, 2-6 cm. wide; spikelets ovate to oblong; lemmas ovate or ovate-elliptic, obtuse or subacute, 2 mm. long; paleas deciduous, with minutely ciliate keels; grain oblong, 0.6-0.8 mm. long .. 21. *unioloides*

Culms much-branched below the middle; spikelets 3-5.5 mm. long, about 2 mm. wide, 8-15-flowered, olive-grey; leaf-blades 1-4.5 cm. long, 1.5-3.5 mm. wide, flat; panicle ovate, loose and open, up to 12 cm. long; spikelets scattered, ovate or ovate-oblong; lemmas broadly elliptic, obtuse, 1.3 mm. long; paleas deciduous, with the keels ciliate; anthers 2, 0.2 mm. long; grain elliptic-oblong, 0.5-0.7 mm. long .. 22. *mekensis*

Glumes pubescent to pilose; lemmas hairy near the margins or only with a few short rigid hairs at the base:

Loosely tufted annuals, 10-60 cm. high; spikelets 2.5-4.5 mm. wide; lemmas 1.8-2.5 mm. long:

Lemmas broadly elliptic or obovate, glabrous except for a few short hairs at the base; leaf-blades 5-10 cm. long, 3-7 mm. wide, flat or rolled; panicle ovate to oblong, open or contracted, 3-17 cm. long, 1-4.5 cm. wide, with the branches often undivided; pedicels up to 1 mm. long; spikelets contiguous, broadly ovate or oblong, 4-12 mm. long, 3-4.5 mm. wide, closely 8-40-flowered, tinged with red or brown; lemmas 2-2.5 mm. long; paleas deciduous, ciliate on the narrowly winged keels; anthers up to 0.5 mm. long; grain broadly elliptic, 1-1.2 mm. long .. 23. *turgida*

Lemmas ovate to ovate-oblong, with a line of white tubercle-based hairs near the margins; leaf-blades 2-18 cm. long, 2-7 mm. wide, flat or rolled; panicle ovate to oblong, open or contracted, 3-23 cm. long, 1.5-10 cm. wide; pedicels up to 8 mm. long; spikelets scattered or contiguous, ovate to oblong, 3-8 mm. long, 2.5-3.5 mm. wide, loosely 8-20-flowered, purplish; lemmas 1.8-2.2 mm. long; paleas deciduous, scaberulous on the keels; anthers 0.6 mm. long; grain broadly elliptic-oblong, 0.7 mm. long by 0.6 mm. wide .. 24. *Scotelliana*

Densely tufted perennials, 40-100 cm. high; spikelets 4-6.5 mm. wide; lemmas 3-3.5 mm. long; leaf-blades 10-30 cm. long, 3-9 mm. wide, flat; panicle broadly ovate or oblong, open, 8-20 cm. long, up to 15 cm. wide, glandular; lateral pedicels 1 mm. long; spikelets ovate to orbicular or oblong, 5-20 mm. long, 7-40-flowered, straw-coloured or purplish; lemmas ovate-oblong, acute, glandular on the keel and nerves, hairy near the margins; paleas deciduous, ciliate on the keels; anthers 1 mm. long; grain broadly oblong, 1.6 mm. long .. 25. *blepharostachya*

††Keels of paleas broadly winged, with the wings up to 0.5 mm. wide and folding over the sides of the adjacent lemmas; leaf-sheaths softly hairy; blades up to 30 cm. long and 5 mm. wide, flat or rolled; panicle loose and open, 10–20 cm. long, up to 16 cm. wide; spikelets scattered, long-pedicelled, ovate to oblong, 6–13 mm. long, 4–5 mm. wide, 10–30-flowered, pale green or straw-coloured; lemmas lanceolate, acute, 3–4 mm. long, glabrous; paleas deciduous; anthers 1.2–1.5 mm. long; grain elliptic-oblong, 1.2 mm. long 26. *Glanvillei*

††Lower 3–4 florets barren and without a palea; spikelets broadly elliptic or elliptic-oblong, slightly twisted; leaf-blades up to 45 cm. long and 2.5 mm. wide, rolled, glabrous; panicle oblong, very loose, up to 30 cm. long and 10 cm. wide; spikelets loosely scattered, 6–7.5 mm. long, 3.8–4.5 mm. wide, strongly flattened and keeled, pale green and tinged with purple; lemmas oblong to ovate-oblong, subobtuse, 3 mm. long, glabrous; paleas deciduous, with ciliate keels; anthers 1.4 mm. long; grain narrowly oblong, 1 mm. long 27. *plurigluma*

1. *Eragrostis ciliaris* R. Br. in Tuckey, Narr. Exped. River Zaire, 478 (1818); Fl. Cap. 7: 629; Chev. in Rev. Bot. Appl. 1934, 117. *E. pulchella* Parr. *Poa ciliaris* L. A loosely tufted annual, 15–60 cm. high, with a pale or purplish narrow panicle.

Senegal to Cameroons! Widely spread in Tropical Africa and Tropical America, also in South Africa and India. Frequent in cultivated land, along roads and paths, etc. Exsicc.—Pirie 10. *Pobéguin* 1819. *Deighton* 538; 586; 2155; 2487. *Chev.* 22056; 23496. *Johnson* 840. *Williams* 224; 460; 470. *Irvine* 252; 1012. *Vigne* 3196. *Warnecke* 170. *Dalz.* 248; 1183. *Barter* 864. *Moisier* 148. *Golding* 16. *Maitland* 83.

2. *E. tenella* Roem. & Schult. Syst. Veg. 2: 576. *E. plumosa* Link; Chev. in Rev. Bot. Appl. 1934, 119. *E. tenella* var. *plumosa* Stapf in Hook. f. Fl. Brit. Ind. 7: 315. *Poa tenella* L. *P. plumosa* Retz. A loosely tufted annual, 6–50 cm. high, with small green or purplish panicles.

French Sudan: Kayes! Senegal: St. Louis! French Guinea: Mamou. Sierra Leone: Ivory Coast. S. Nigeria: Lagos! Ibadan! Opo! Victoria! Common throughout the tropics of the Old World. On cultivated ground, roadsides and waste places. Exsicc.—Chev. 28022. *Deighton* 1503; 2025; 2269. *Jeffress* 12. *Davoudi* 338. *Thomas* 1632. *Dalz.* 1323. *Schlechter* 12328. *Maitland* 14.

3. *E. diaphanoides* Steud. Syn. Pl. Glum. 1: 268; Chev. in Rev. Bot. Appl. 1934, 117. *E. interrupta* Chev. l.c. 269, non Beauv. *E. interrupta* var. *diaphanoides* Stapf in Hook. f. Fl. Brit. Ind. 7: 316. *E. Leprieurii* Steud. A loosely tufted annual, 10–70 cm. high, with erect greenish or purplish panicles.

French Sudan: El Oualadi; Diré; Ouagadougou, etc. Senegal: Gambia! French Guinea: Kouroussa and Baffing Valley! Gold Coast! N. Nigeria: Nupe! Abinsi! Marte! S. Nigeria: Stirling Hill! Also in Belgian Congo, Sudan, Eritrea, Egypt and eastward to India. Exsicc.—Heudelot 546. *Chev.* 2227. *Pirie* 58. *Pobéguin* 535; 1820. *Williams* 464. *Beal* 39. *Barter* 1361. *Dalz.* 908. *Golding* 39.

4. *E. namaquensis* Nees, Ind. Sem. Vratiss. 1835, and in Linnaea, 11: Lit. 125; Fl. Cap. 7: 630; Chev. in Rev. Bot. Appl. 1934, 119. *E. interrupta* var. *namaquensis* Durand & Schinz, Consp. Fl. Afr. 5: 884. A tufted annual, 15–100 cm. high, with pale or purplish panicles.

French Sudan: Zinder! Bamako. Togo: Sokode—Basari! N. Nigeria: Jeba! Also in Abyssinia and southwards to South Africa. Exsicc.—Hagerup 613. *Schroeder* 124. *Barter* 993.

5. *E. aspera* Nees, Fl. Afr. Austr. 408; Fl. Cap. 7: 628; Chev. in Rev. Bot. Appl. 1934, 117. *Poa aspera* Jacq. P. *Hippuris* Schum. An annual, 15–90 cm. high, with large loose panicles.

French Sudan: Bamako; Ségou. Gambia! French Guinea: Kouroussa! Baffing Valley! Tinkisso Valley! Gold Coast: Tamale! N. Nigeria: Nupe! Jeba! Lokoja! Katagum District! Abinsi! S. Nigeria: Aguku District! Yayanga! Common throughout Tropical Africa, also in South Africa and India. On cultivated ground, waste places, etc. Exsicc.—Pirie 50. *Pobéguin* 528; 533; 1755*; 1799. *Williams* 463. *Beal* 3. *Barter* 859. *Dalz.* 272; 881. *Thomas* 1379.

6. *E. macilenta* Steud. Syn. Pl. Glum. 1: 288. *Poa macilenta* A. Rich. Annual, up to 70 cm. high, with slender culms and loose nodding panicles.

Ivory Coast: between Samou and Ouodé! S. Nigeria: Bamenda! Also in Tropical East Africa from Eritrea to Tanganyika Territory. Exsicc.—Chev. 21620. *Maitland* 10D.

7. *E. densa* De Wild. in Bull. Jard. Bot. Brux. 6: 61, t. 3. A loosely tufted annual, up to 45 cm. high, with slender geniculate culms and erect graceful panicles.

French Guinea: Mamou! Baffing Valley! Timbo! Sierra Leone: Karina! Kambia! Njola! Bumbuna! S. Nigeria: Ogurude! On roadsides and paths, etc. Also in the Belgian Congo. Exsicc.—Chev. 34893. *Pobéguin* 1749; 1749 bis; 1832. *Glanville* 77. *Deighton* 915; 1869. *Thomas* 3210. *Holland* 286.

8. *E. linearis* Benth. in Hook. Niger Fl. 567. *E. guineensis* Trin. *E. senegalensis* Nees. *E. albescens* Steud. *E. pallens* Hitchc.; Chev. in Rev. Bot. Appl. 1934, 119. *E. Hagerupii* Hitchc. *Poa linearis* Schumacher. *P. subulata* Desv. A tufted perennial, with erect or geniculate rigid culms, up to 130 cm. high, and usually narrow dense panicles.

French Sudan: Timbuctoo! Kobara! Gourma—Haoussa—Yalakala! Senegal: Niayes! Sompi! Richard-tol! Dakar! Gambia! Gold Coast: Cape Coast! Accra! S. Nigeria: Lagos! R. Niger! On inland and coastal sands. Also on Sao Thomé. Exsicc.—Hagerup 105; 784. *Lean* 73; 81. *Rogee* 481. *Chev.* 2411; 2412; 2415. *Leprieur*. *Heudelot* 545. *Vogel*. *Thollon* 670. *Dalz.* 1118.

9. *E. aegyptiaca* Delile, Fl. Egypt. 157; Chev. in Rev. Bot. Appl. 1934, 116. *Poa aegyptiaca* Willd. A tufted annual, 2–30 cm. high, with slender geniculate culms and pale green dense panicles.

French Sudan and Senegal (acc. to Chevalier). Also in Anglo-Egyptian Sudan and Egypt.

10. *E. albidia* Hitchc. in Journ. Wash. Acad. Sci. 19: 304; Chev. in Rev. Bot. Appl. 1934, 116. A tufted annual, with very slender geniculate culms, 15–50 cm. high, and pale open panicles.

French Sudan: San! Bourem! Saraféré! Kobara! Macina! Timbuctoo! N. Nigeria: Kalkala! Nupe! In cultivated fields and in alluvial soils, etc. Exsicc.—Chev. 1093; 1224; 42484; 42557. *Lean* 10; 61; 80. *Hagerup* 160. *Guyon* 132. *Barter* 321.

11. *E. pilosa* Beauv. Agrost. 162. *E. tenuiflora* Rupr.; Chev. in Rev. Bot. Appl. 1934, 120. *E. stenogalenis* Chev. l.c. (in part), non Nees. *Poa pilosa* L. *P. senegalensis* Desv. A slender annual, 7–70 cm. high, with erect or geniculate culms, and graceful erect or nodding panicles.

French Sudan: Timbuctoo! Ouagadougou! Adrar des Iforas! Agadés! Senegal: Goundom! Gold Coast: Kintampo! N. Nigeria: Bauchi Plateau! N. Nigeria: Kano! Sokoto! Vodni! S. Nigeria: Ibadan—Abokuta! Abok! Lagos! Common in tropical and warm temperate regions. In cultivated places, etc. Exsicc.—Lean 78. *Chev.* 2224; 24748; 42685; 42717; 43452. *Heudelot* 311. *Vigne* 3197. *Lely* 294; 762. *Hagerup* 646a. *Dalz.* 492. *Schlechter* 13013. *Barter* 400. *Davoudi* 197.

12. *E. Cambessediana* Steud. Syn. Pl. Glum. 1: 269; Chev. in Rev. Bot. Appl. 1934, 117. *E. stenophylla* Hochst. *E. ovina* Hochst. *E. Flaminiis* De Wild. *Poa Cambessediana* Kunth. *Poa ovina* A. Rich. A loosely tufted annual, with slender geniculate culms, 15–45 cm. high, and nodding panicles.

French Sudan: Kabarah! Timbuctoo! Senegal: French Guinea: Kouroussa! Timbo! Dalaba! Fouta Djallon! Mamou! Sierra Leone: Makump! Tombo! Freetown! Njala! etc. Gold Coast: N. Nigeria: Kano! Vodni! S. Nigeria: Lagos! Opo! Victoria! Also in the Belgian Congo, Abyssinia

- and India. In cultivated and waste lands, etc. Exsicc.—Chev. 1326; 18305; 34599; 34896. *Hagerup* 235; 645. *Pobéguin* 485; 497; 1754. *Glanville* 67. *Deighton* 996; 1223; 2051; 2103. *Thomas* 21; 2071; 2180; 5721. *Lindon* 37. *Dawodu* 176. *Maitland* 13.
13. *E. gangesica* Steud. Syn. Pl. Glum. 1: 266; Chev. in Rev. Bot. Appl. 1934, 118. *E. bififormis* Benth. *E. bromoides* Jedw. *Poa gangesica* Roxb. *P. bififormis* Kunth. A densely tufted perennial, 30–100 cm. high, with erect stiff culms, and usually lax nodding panicles.
- Senegal to Cameroons! Also in many parts of Tropical Africa, in South Africa and throughout Tropical Asia. In wet places. Exsicc.—Chev. 2422; 24938. *Hagerup* 329. *Lean* 6: 38; 92; 94. *Pirie* 4. *Sc. Elliot* 4264; 5337. *Deighton* 2279. *Glanville* 204. *Thomas* 689; 1495. *Williams* 507. *Lely* 760. *Dalz.* 270; 494; 496; 877. *Barter* 622. *Holland* 273; 281. *Maitland* 10A; 713. *Migeod* 316; 405.
14. *E. tremula* Hochst. ex Steud. Syn. Pl. Glum. 1: 269; Fl. B. I. 7: 320; Chev. in Rev. Bot. Appl. 1934, 120. *E. Lamarckii* Steud. *Poa tremula* Lam. A tufted annual, 15–120 cm. high, with erect culms, and usually large nodding panicles.
- Mauritania to Nigeria! Also in most parts of Tropical Africa and in India. Frequent in dry sandy soils, in cultivated and waste land, on roadsides, etc. Exsicc.—*Hagerup* 275. Chev. 33951. *Pirie* 9. *Jacques-Felix* 198; 199. *Pobéguin* 529; 1830. *Glanville* 89. *Williams* 7; 450. *Vigne* 3204. *Warnecke* 104. *Golding* 3. *Moister* 149; 150. *Dalz.* 249; 271; 493; 1127; 1320; 8416; 8417. *Vogel* 156. *Barter* 351.
15. *E. squamata* Steud. Syn. Pl. Glum. 1: 274. *Poa squamata* Lam. A densely tufted perennial, 25–90 cm. high, with erect culms, and open erect or slightly nodding panicles.
- Kenegom! Cassance! French Guinea; Timbo! Baffing Valley! Sierra Leone: Masuri! Kambia! Kitchem! Common all along Sumbuya-Mano road! Njala! etc. Gold Coast: Atwabo! N. Nigeria: Nupe! S. Nigeria: Opobo! Lagos! Also in French and Belgian Congo. In grasslands and on roadsides. Exsicc.—*Heudelot* 560. Chev. 2414. *Pobéguin* 1750; 1750 bis. *Glanville* 91. *Deighton* 923; 1008; 1224; 1688; 1778; 2137. *Thomas* 236. *Fishlock* 71. *Barter* 729. *Maitland* 63. *Dalz.* 1308.
16. *E. cilianensis* Lutati in Malpighia, 18: 386. *E. major* Host; Fl. Cap. 7: 620; Chev. in Rev. Bot. Appl. 1934, 118. *E. megastachya* Link. *Briza Eragrostis* L. *Poa cilianensis* All. *P. megastachya* Koel. *P. caethetica* Schumacher. A loosely tufted annual, 15–90 cm. high, with geniculate or erect culms, and greyish or pallid panicles.
- Mauritania. French Sudan: Mossi! Timbuctoo! Macina! etc. Senegal! Gold Coast: Tong Hills! N. Nigeria: Mongonu! Kworre! Katagum District! Abinsi and vicinity! Naraguta! Nupe! S. Nigeria: Aboh! Ibadan Road! Lagos! Widely spread throughout the tropical and warm regions of the world. Frequent in cultivated and waste ground, on roadsides, etc. Exsicc.—Chev. 24775; 43914. *Hagerup* 272. *Lean* 11. *Williams* 522. *Golding* 2. *Palmer* 33. *Dalz.* 269; 874. *Lely* 293; 428; 784. *Barter* 336. *Dawodu* 5.
17. *E. Pobéguinii* C. E. Hubbard in Kew Bull. 1936: ined. Perennial, with slender erect hairy culms, up to 40 cm. high, and narrow erect panicles.
- French Guinea: Timbo! Exsicc.—*Pobéguin* 1092.
18. *E. Volkensii* Pilger in Engl. Bot. Jahrb. 43: 95. Perennial, with slender wiry many-noded culms, 40–80 cm. high, and dark green panicles.
- S. Nigeria: Bamenda, 7,500 ft.! Also on mountains in Tanganyika Territory and Nyassaland.
19. *E. chalarothyrsos* C. E. Hubbard in Kew Bull. 1936: ined. Perennial, with erect stout culms up to 1.3 m. high, and large very loose panicles.
- Sierra Leone: Mange! In grassfields. Exsicc.—*Glanville* 240.
20. *E. Barteri* C. E. Hubbard in Kew Bull. 1936: ined. Annual, with geniculate culms, rooting at the lower nodes, up to 40 cm. high.
- N. Nigeria: Nupe! In cultivated ground. Exsicc.—*Barter* 877.
21. *E. unioides* Nees ex Steud. Syn. Pl. Glum. 1: 264. *Poa unioides* Retz. Annual, with loosely tufted or solitary slender culms up to 45 cm. high, and green or purplish panicles.
- Sierra Leone: Hill Station! Widely spread in Tropical Asia, introduced elsewhere. Exsicc.—*Deighton* 2031.
22. *E. mokensis* Pilger in Engl. Bot. Jahrb. 51: 419. A slender branched annual up to 25 cm. high, with loose panicles and olive-grey spikelets.
- Fernando Po; Moka! Mountain pastures. Exsicc.—*Mildbraed* 7102.
23. *E. turigida* De Wild. Comp. Kasai, 250. *E. rubiginosa* Trin.; Chev. in Rev. Bot. Appl. 1934, 119. *Poa turigida* Schumacher. *Briza rubella* Steud.
- French Sudan: Guéila! San! Gourma and Mossi! French Guinea: Kouroussa! Baffing Valley! Ivory Coast: Haut-Sassandra. Gold Coast: Achimota! Accra! N. Nigeria: Zaria! Vodni! Naraguta! Katagum District! Nupe! S. Nigeria: Lagos! Also in Sudan and Uganda. In cultivated ground and damp places. Exsicc.—Chev. 315; 2423; 24550. *Pobéguin* 1094; 1752. *Irvine* 1630. *Don.* *Dalz.* 172; 251. *Lely* 403; 757. *Barter* 401. *Dawodu* 175.
24. *E. Scotelliana* Rendle in Journ. Linn. Soc., Bot. 30: 99; Chev. in Rev. Bot. Appl. 1934, 120. A loosely tufted annual, 20–60 cm. high, with slender culms, and erect purplish panicles.
- French Guinea: Baffing Valley! Timbo! Dalaba! Sierra Leone: near Regent! Tambiama. Also in the Cameroons. In wet places and in cultivated ground. Exsicc.—*Pobéguin* 1748; 1753. *Sc. Elliot* 4114. *Glanville* 157.
25. *E. blepharostachya* K. Schum. in Engl. Bot. Jahrb. 24: 336. A densely tufted perennial, with erect rather stout culms up to 1 m. high, and open panicles of broad spikelets.
- Gold Coast: Kumawo! Kintampo! Aburi! Epesus! Dahomey: Sokode! Misahohe! In savannah forest. Exsicc.—*Chipp* 487. *Vigne* 3207. *Houze* 1063. *Basmann* 231; 247. *Kling* 79. *Büttner* 120.
26. *E. Glanvillei* C. E. Hubbard in Kew Bull. 1936: ined. A densely tufted perennial up to 1 m. high, with erect slender to stout culms and open panicle of large nodding spikelets.
- Sierra Leone: near Kayih! N. Nigeria: Naraguta! Exsicc.—*Glanville* 426. *Lely* 450.
27. *E. plurigluma* C. E. Hubbard in Kew Bull. 1934, 116. A tufted perennial, up to 1.2 m. high, with erect culms and loose nodding panicles.
- French Guinea! Sierra Leone: Materbol! Swampy fields. Exsicc.—*Farmar*. *Glanville* 79.

20. TRIPOGON Roem. & Schult.—F.T.A. 9: 22 (in key).

Densely tufted, about 30 cm. high; leaves very narrow and convolute, closely ribbed, glabrous, up to 15 cm. long; spikes terminal, solitary, slender, long-pedunculate; spikelets usually remote, compressed, subsessile, dark green, about 1 cm. long; glumes subequal, broadly lanceolate, sharply pointed, 7–8 mm. long, lower keeled its full length, upper keeled towards the top; lemmas imbricate, similar to the glumes, awned; callus villous 1. *major*

Densely tufted, up to 15 cm. high; leaves very narrow, convolute and appearing almost terete, 3–4 cm. long, glabrous or thinly pilose; spikes very slender and delicate, 2–3 times as long as the leaves, on slender peduncles; spikelets loosely overlapping, about 2.5 mm. long; glumes narrowly lanceolate, acute, the lower half as long as the upper 2. *minimus*

1. *T. major* Hook. f. in Journ. Linn. Soc. 7: 230 (1864). A *Lolium*-like grass, with two closely allied species in the mountains of Uganda.
Camerouns Mt.: 7,000–8,000 ft. (Dec.)! Meyer Crater Region, 7,800 ft., growing in lava flow (Jan.)! In grassland, 7,000 ft. (May, past fl.)! Exsicc.—Mann 2098. *Preuss* 974. *Mailand* 640; 918.
2. *T. minus* Hochst. ex A. Rich. Fl. Abyss. 2: 436 (in syn.). Steud. Synop. Pl. Gram. 301; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 131. *Festuca minima* A. Rich. A small tufted grass in non-cultivated places. Senegal! N. Nigeria; Sokoto (Aug.)! S. Nigeria: Lagos, on rocks! Also in Abyssinia and the Shari. Exsicc.—Heudelot 290. *Dalr.* 498. *Dawodu* 232. (See Appendix).

21. DESMOSTACHYA Stapf in Dyer, Fl. Cap. 7: 632 (1900).

Perennial, branched at the base; branches covered with leathery sheaths and with a tuft of coarse leaves; ligule a short ciliate rim; blades long, gradually tapered to the apex, closely ribbed; panicle dense and spike-like, 15–20 cm. long, 2–3 cm. broad; spikelets falling entire, closely packed, light straw-coloured or tinged with brown or purple, many-flowered, linear, strongly laterally compressed, about 5 mm. long; glumes very unequal, membranous, 1-nerved *bipinnata*

- D. bipinnata* Stapf l.c.; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 116. *Uniola bipinnata* Linn. *Eragrostis cynosuroides* Beauv. *Pogonarthria bipinnata* Chiov. Stiffly erect up to 3 ft. high, pale glaucous-green. Mauritania: Bilal. Also north of Mauritania, Egypt, Palestine, E. Sudan to Abyssinia, and to India. Exsicc.—Ducellier 28658. (See Appendix).

22. DIPLACHNE Beauv. Agrost. 80, t. 16 (1812); F.T.A. 9: 20 (in key); Fl. Cap. 7: 590.

Perennial; culms tufted, geniculate, often branched from the lower nodes, up to nearly 2 m. long; sheaths minutely scabrid on the close nerves; ligule large, hyaline, up to 5 mm. long; blades very narrow, linear, tapering to a fine pungent point, up to 20 cm. long, convolute, scabrid; racemes erect, with slightly flexuous branches up to 17 cm. long; spikelets overlapping by half their length or more, narrowly oblong, about 1 cm. long, olive-green or rarely pale; glumes lanceolate to oblong, obtuse or acute, lower 2 mm., upper 3–4 mm. long; lemmas oblong, tips broad, entire or emarginate with a tooth on one or both sides, middle and side nerves excurrent into a short or obscure mucro, side-nerves silky-ciliate below *fusca*

- D. fusca* Beauv. l.c. 163; Fl. Cap. 7: 591; Chev. Bot. 748. *Festuca fusca* Linn. *D. alba* Hochst. Senegal: Monke village (Jan.)! Seleki, Casamance (Jan.)! French Sudan: Zinder (Oct.)! N. Nigeria: shores of Lake Chad, near Aregu, N. Bornu (Dec.)! Widely spread throughout the warmer regions of the Old World, mainly near water. Exsicc.—Roger 59. Chev. 2404. *Hagerup* 576. *Elliot* 155.

23. LEPTOCHLOA Beauv. Agrost. 71, t. 15, fig. 1 (1812); F.T.A. 9: 20 (in key).

Leaves broad, oblong-lanceolate, somewhat rounded at the base, very finely acute at the apex, 4–12 cm. long, 0.8–1.7 cm. broad, very thin, with about 5 principal lateral nerves conspicuous below, and 10–15 fine nerves between each, glabrous, the midrib whitish and conspicuous when dry; sheaths 2.5–5 cm. long, glabrous; ligule membranous and jagged; racemes oblong, up to 25 cm. long, with slender lateral branches bearing second spikelets 2 mm. long; glumes with a green scabrid keel and pale margins, mucronate-acute 1. *uniflora*

Leaves narrow:

Culms about 10–12-noded, hard and rooting at the base, nodes glabrous; sheaths open upwards, closely nerved; blades linear, up to 20 cm. long, minutely scabrid on the very close nerves; ligule membranous and jagged; racemes as above; spikelets 3 mm. long; glumes with a green keel and membranous sides, minutely scabrid, subacute 2. *coerulescens*

Culms fewer-noded (about 4), very slender, nodes long-exserted; sheaths open upwards, pilose, with a few slender tubercle-based hairs; blades broadly linear, about 8 cm. long and 4 mm. broad, tapered to a point, very minutely scabrid on the close nerves; ligule membranous and jagged; racemes slender, oblong, with very small minutely scabrid spikelets; glumes keeled, membranous 3. *chinensis*

1. *Leptochloa uniflora* Hochst. ex A. Rich. Tent. Fl. Abyss. 2: 409. About 2 ft. high. Gold Coast: Aburi (Mar. and Sept.)! S. Nigeria: Aguku District! Also in Abyssinia, E. Africa, Belgian Congo and Angola, and in India. Exsicc.—Johnson 833. *Deighton* 613. *Thomas* 1000; 1045; 1764.
2. *L. coerulescens* Steud. Synop. Plant. Gram. 209 (1854). Senegal! French Sudan: Labezenga (Sept.)! Sierra Leone: Batkanu (Apr.)! Njala (May)! Near Rokupra, tidal swamp rice field (Jan.)! Makump, N. Prov. (May)! N. Nigeria: Nupe, wet plains! S. Nigeria: Lagos, Ojan R. (June)! Tropical Africa generally. Exsicc.—Roger xxiv. *Hagerup* 444. *Thomas* 11. *Deighton* 644; 911; 1702; 1731. *Barter* 160. *Denton* 49. *Dawodu* 214.
3. *L. chinensis* Nees in Syll. Ratib. 1: 4 (1824); Agrost. Bras. 432; Chev. Bot. 748; Rev. Bot. Appl. Agric. Trop. 1934: 121. *Poa chinensis* Linn. Gold Coast: Takoradi, edge of bush in slight shade (Mar.)! Widely distributed. Exsicc.—Deighton 559.

24. TRICHONEURA Anderss.—F.T.A. 9: 21 (in key); Ekman in Arkiv. Bot. 11, No. 9: 1–19 (1912).

Annual up to 35 cm. high, branched from the base; lower nodes exserted; leaf-sheaths more or less long-pilose with weak minutely tubercle-based hairs; blades 4–6 cm. long, about 4 mm. broad, tapered from the base to apex, thinly pilose below and

minutely scabrid; ligule large and membranous, truncate-erose; racemes 10–18 cm. long, with up to 30 ascending spikes 2–5 cm. long; axis angular, pubescent; spikelets overlapping, about 4-flowered; glumes narrowly lanceolate, bristly-acuminate, subequal, about 7 mm. long; lemmas awned from a cleft rounded apex, villous-ciliate on the lateral nerves *molliis*

T. molliis Ekman l.c. 10, t. 1, fig. 3; t. 2, figs. 9–11 (1912). *Leptochloa molliis* Kunth. *Triodia molliis* Dur. & Schinz. *Crossotropis molliis* Stapf. *Leptochloa longiglumis* Hitch.
Senegal! French Sudan: Labezanga, in dry locality (Sept.)! N. Nigeria: Sokoto (Oct.)! Exsicc.—Roger 56, partly. Hagerup 453. Moiser 135.

25. DINEBRA Jacq.—F.T.A. 9: 21 (in key).

Annual, erect, up to 1 m. high; leaf-sheaths glabrous or finely pilose with tubercle-based hairs; ligule membranous; blades flat, broadly linear, gradually very acute, up to 15 cm. long and 1 cm. broad, with about 3 main nerves on each side of the midrib, glabrous or sparingly hairy; racemes up to 25 cm. long, strict; spikes at first erect, at length deflexed, 4–6 cm. long, with a short tuft of hairs at the base, biseriate on one side of a flattened slightly wavy axis; glumes aristate-acuminate, 7 mm. long

retroflexa

D. retroflexa Panzer in Denkschr. Acad. Münch. 270, t. 12 (1814); Bolss. Fl. Or. 5: 557. *Cynosurus retroflexus* Vahl. Symb. Bot. 2: 20 (1791). *Dinebra arabica* Jacq. Fragm. Bot. 77, t. 121 (1809); Fl. Brit. Ind. 7: 297; Chev. Bot. 746, and Rev. Bot. Appl. Agric. Trop. 1934: 130.
Senegal! Mauritania! Extends eastwards to S.E. Europe, India and Ceylon; St. Helena, Angola, East Africa from E. Sudan to the Transvaal. Exsicc.—Roger 11. Chev. 2338. (See Appendix).

26. ELEUSINE Gaertn. Fruct. 1: 7, t. 1 (1788).—F.T.A. 9: 21 (in key).

Branches of inflorescence in more than 1 whorl, slender, up to 10 cm. long, bearing the spikelets on the lower side; spikelets compressed, contiguous, several-flowered, up to 1 cm. long; glumes glabrous, the lower aristate-acuminate; leaves flat, 3–4-nerved on each side of the midrib, margin scabrid; ligule densely ciliate .. 1. *verticillata*
Branches of inflorescences in 1 whorl with occasionally 1 or 2 odd branches below:
Spike slender, straight, up to 18 cm. long; culms 2–3-noded, the upper nodes exserted; leaves crowded near the base; sheaths compressed, glabrous except the ciliate margins; ligule long-fimbriate; blades linear, acute, 3–6 mm. broad, smooth; spikelets about 4 mm. long, 3–6-flowered, disarticulating above the glumes

2. *indica*

Spikes stout, often curved; like the above but much more robust and taller

3. *coracana*

1. **Eleusine verticillata** Rorb. Fl. Ind. 1: 346 (1820); Fl. Brit. Ind. 7: 295. An erect slender annual with second spikes in whorls.

French Sudan: Timbuktu (Aug.)! Senegal! Old World tropics. Exsicc.—Heudelot 309. Hagerup 282.

2. **E. indica** Gaertn. Fruct. 1: 8; Fl. Brit. Ind. 7: 293; Fl. Cap. 7: 645; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 129. *Eleusine glabra* Schum. Erect annual with digitate spikes of crowded second spikelets. (See Appendix).

Common throughout the area and widely distributed in the tropics of the Old World, introduced into America.

3. **E. coracana** Gaertn. Fruct. 1: 8, t. 1, fig. 11; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 128. *E. Tocussa* Fresen. Robust, up to 5 ft. high, with stout digitate spikes of crowded second spikelets; grain finely striate.

N. Nigeria, often cultivated. Exsicc.—Lely 515. Dalz. 280. Baikia. (See Appendix).

27. DACTYLOCTENIUM Willd.—F.T.A. 9: 21; Fl. Cap. 7: 646.

Annual up to 0.75 m. high; culms sometimes prostrate, rooting from the lower nodes; nodes long-exserted; sheaths closely nerved; blades broadly linear from a broad base, tapered to a fine point, up to 20 cm. long and 7 mm. broad, more or less pilose and ciliate with tubercle-based hairs, with about 4 main nerves on each side of the midrib; spikes 2–6, unilateral on a keeled rhachis, barren at the top, up to 5 cm. long; spikelets 3–5-flowered, spreading, 3 mm. long, glabrous; lower glume 1.5 mm. long, the upper cuspidate or awned, awn curved *aegyptium*

D. aegyptium Beauv. Agrost. sub. t. xv (1812); Chev. Rev. Bot. Appl. Agric. Trop. 1934: 129. *Cynosurus aegyptius* Linn. *D. aegyptiacum* Willd.; Chev. Bot. 747. *Chloris guineensis* Schum. *D. prostratum* Link; Chev. l.c.

Throughout the area; widely spread in the tropics and subtropics. (See Appendix).

28. COELACHYRUM Nees in Linnaea 16: 221 (1842).—F.T.A. 9: 21 (in key).

Culms up to 40 cm. high, erect, smooth, branched below; nodes glabrous; leaf-sheaths glabrous; ligule very short; leaf-blades 5–6 cm. long, 2–3 mm. broad, scaberulous at the acuminate apex; panicle 4–5 cm. long, 3–5-branched, branches 2.5–3 cm. long; spikelets 3–5–4 mm. long, 6–8-flowered, subcompressed, green, ovate in outline; glumes not keeled *oligobrachiatum*

C. oligobrachiatum A. Camus in Bull. Mus. Hist. Nat. Paris 1931: 546; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 128.

Central Sahara: Adrar des Iforas; Izellene. Exsicc.—Monod 373.



FIG. 354.—*ELEUSINE INDICA* Gaertn., (GRAMINEAE-ERAGROSTEAE).

A, junction of sheath and blade of leaf. B, ligule. C, portion of spike. D, spikelet. D₁, lower glume. D₂, upper glume. D₃, lemma. E, stamens and pistil. F, grain.

- 29. CTENIUM** Panz. in Denkschr. Acad. Muench. 1813 : 288, t. 13.—F.T.A. 9 : 21 (in key); Fl. Cap. 7 : 638; Pilger in Notizbl. Bot. Gart. Berl. 9 : 114 (1924).

Spikes solitary :

Annual with broadish flat leaves; spikes curved, up to 25 cm. long; third to fifth glumes and flowering glume papillous; bristle from the lateral nerve of the second glume short or absent; fourth and fifth glumes weakly hairy with single long hairs

1. *elegans*

Perennial with very narrow convolute leaves; spikes curved, up to 15 cm. long; third to fifth glumes not papillous; bristle from the lateral nerve of the second glume well developed

2. *Newtonii*

Spikes digitate, 2-4 together, 10-15 cm. long; peduncle densely and softly pubescent towards the apex; fifth glume very long-hairy

3. *canescens*

1. *Ctenium elegans* Kunth. Rev. Gram. 1 : 93 (1829); Pilger l.c. 115; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 128.

Senegal! French Sudan: Niamey (Oct.)! Gambia! N. Nigeria: Sokoto (Sept.)! Katagum! Also in Algeria and Eastern Sudan. Exsicc.—Heudelot 143. Roger in Herb. Gaz. Hagerup 480. Brooks 9. Dalz. 247; 505. (See Appendix).

2. *C. Newtonii* Hackel in Bol. Soc. Brot. 5 : 229 (1887); Pilger l.c. 115, incl. var. *majusculum* Pilger, l.c. 116. French Guinea and French Sudan to N. and S. Nigeria, and in Eastern Sudan and Angola. Exsicc.—Chev. 2333. Pobéguin 496; 1769. Glanville 93. Deighton 919. Linder 1449. Hoes 1082. Brown 426. Mailand 166. Lely 798. Beal 16. Dalz. 1120. Carter 975. Thomas 3930.

3. *C. canescens* Benth. in Hook. Niger Fl. 566 (1849); Pilger l.c. 118; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 128.

Dahomey: Whydah. N. Nigeria: Lokoja! Exsicc.—Barter. Don.

I have not seen *C. camposum* A. Chev. l.c., of which he gives a very short description, from Baoulé, Ivory Coast (Chev. 34286).

30. ENTEROPOGON Nees—F.T.A. 9 : 21 (in key); Fl. Brit. Ind. 7 : 284.

Perennial, rather wiry; leaf sheaths loose, glabrous; ligule a tuft of long fine hairs; blades elongate-linear, up to about 25 cm. long, with about 4 main nerves on each side of the midrib, glaucous-green, glabrous; spikelets arranged in long second solitary 15-20 cm. long spikes, overlapping; glumes long-awned, about 1.5 cm. long, including the awn *macrostachyus*

- E. macrostachyus* Benth. in Journ. Linn. Soc. 19 : 101. *Chloris macrostachya* Hochst. Up to about 3 ft. or more in height, with long-pedunculate curved one-sided spikes.

Gold Coast: Achimota, Accra Plains (Apr. and June)! Also in Angola and East Africa from Abyssinia to Tanganyika. Exsicc.—Dalz. 168. Irvine 652.

31. TETRAPOGON Desf. Fl. Atlant. 2 : 388, t. 255 (1799).

Culms ascending, glabrous; nodes glabrous, long-exserted; leaf-sheaths tight; ligule very shortly ciliate; blades linear, glaucous, about 6 cm. long, ciliate with long hairs towards the base; upper sheaths dilated-spathaceous, with or without a short blade, enclosing the inflorescence, submembranous and closely nerved, at length deciduous; inflorescence shortly pedunculate, 4-5 cm. long; spikelets secund, densely overlapping, 4-5-flowered; glumes very unequal, lower long-acuminate, longer than the spikelet, membranous; awns stramineous, minutely barbellate *spathaceus*

- T. spatheaceus* Hack. ex Dur. & Schinz—Consp. Fl. Afr. 5 : 864 (1895); Chev. Bot. 746; Rev. Bot. Appl. Agric. Trop. 1934 : 131. *Chloris spatheacea* Hochst.

Mauritania. French Sudan: Sompl. Tabankort, north of Timbuktu (Jan.)! Gao to Tabankort. In Gall, French Niger; near Tahoua. Also in Cape Verde Islands, and extends to the Red Sea Provinces, N. Kenya and Arabia. (See Appendix).

32. CHLORIS Sw. Prod. Veg. Ind. Occ. 25 (1788).—F.T.A. 9 : 21 (in key).

Lemma long-pilose with silky white hairs :

Annual; upper leaf-sheath spathaceous and more or less embracing the racemes, with a very much-reduced blade; racemes 4-6 cm. long, 2-3-nate; spikelets 6 mm. long, pale brown; glumes unequal, lower 3.5 mm. long, upper 6 mm. long, aristate-acute; lemma boat-shaped, long-ciliate on the nerves, aristate near the apex, awn 4 mm. long, minutely barbellate 1. *lampproparia*

Perennial; upper leaf-sheath not spathaceous, the inflorescence exserted; racemes numerous (15-30), slender, umbellate or in tiers, up to 15 cm. long; spikelets 5 mm. long; glumes persistent, very unequal, narrowly lanceolate, closely plicate, carinate, upper twice as long as the lower; lemma laterally compressed and linear-lanceolate, long-pilose-ciliate on the nerves, aristate, awn about 3 cm. long

2. *robusta*

Lemma without long white hairs (except the upper part of margins) :

Lemma shortly awned, the awns less than twice as long as the lemma :

Lemma shortly ciliate on the keel and nerves, compressed, bilobed, at length appearing truncate, elliptic when viewed from the side, awn about $1\frac{1}{2}$ times as long; glumes compressed, lower 1.5 mm. long, upper 2 mm. long, mucronate-aristate 3. *pilosa*

Lemma glabrous on the keel and shortly ciliate only at the apex and base of the nerves, not appearing at length truncate; awn about as long as the lemma; glumes as in *C. pilosa* 4. *Gayana*



FIG. 355.—*CHLORIS GAYANA* Kunth. (GRAMINEAE-CHLORIDEAE).
A, ligule. B, lower and upper glumes. C, florets. D, lemma of fertile floret flattened out.

Lemma long-awned, awns more than twice as long :

- Rudimentary floret very minute, on a long rhachilla-joint ; spikelets 2-awned ;
 lemma nearly glabrous 5. *pycnothrix*
 Rudimentary floret cuneate on a rather short joint :
 Spikelets 4-6-awned ; lemma oblong-lanceolate, acute, ciliate towards the apex

Spikelets 3-awned ; lemma elliptic, subacute, ciliate in the upper part 6. *Prieuri*
 7. *barbata*

1. *Chloris lampproparia* Stapf in Bull. Soc. Bot. Fr. 1911 : Mém. 8 : 220 ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 98. A tufted annual 1-2 ft. high ; racemes 2-3, embraced by the upper spathe-like leaf sheath.
 French Sudan : Ouagadougou (Aug.) ! Also in Baguirmi. Exsicc.—Chev. 24874.
2. *C. robusta* Stapf l.c. 221 ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 127. Perennial or annual, 4-9 ft. high, often in river beds, with several (15 or more) slender racemes ; upper leaf-sheath not spatheous.
 Gold Coast : near the water on banks of Volta River (Jan.) ! Dahomey : between Lake Azri and Zagnanado (Feb.) ! N. Nigeria : Borgu ! Sokoto (Dec.) ! Yola (Dec.) ! Jebba (Dec.) ! S. Nigeria : Lagos ! Also in the Shari Region and Belgian Congo. Exsicc.—Irvine 1920. Chev. 23054 ; 23092. Barter 878. Dalz. 289 ; 500. Hagerup 692. Foster 2. (See Appendix).
3. *C. pilosa* Schum. & Thonn. Beskr. Guin. Pl. 55 (1827). *C. breviseta* Benth. in Hook. Niger Fl. 566 (1849) ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 125. Closely allied to *C. submutica* H.B. & K., from Tropical America, but which has racemously arranged spikes.
 Common from the Cape Verde Islands and French Sudan to N. and S. Nigeria, Fernando Po, St. Thomas, N.E. Trop. Africa, Uganda, and Belgian Congo. Exsicc.—Roger 22. Pobeguín 546 ; 1824. Deighton 558 ; 674 ; 1462 ; 1522 ; 2029. Glanville 75. Linder 520. Vogel 41. Beal 15. Johnson 1009 ; 1025. Newton 4. Barter 496. Hagerup 739. Lely 419 ; 752 ; 767. Moiser 145. Palmer 9. Dalz. 278 ; 1124. Parsons 4. Dawson 28. Denton 41. Mailand 9. Millen 84. Mann 118. (See Appendix).
4. *C. Gayana Kunth* Rev. Gram. 1 : 89 ; 2 : 293, t. 58 ; Stapf in Dyer Fl. Cap. 7 : 642 ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 125. Perennial up to 4 ft. high.
 French Sudan : Timbuktu (Aug.) ! Senegal (Feb.) ! Widely spread in East Africa and South Africa. Exsicc.—Hagerup 276. Dollinger 21. Roger 40. (See Appendix).
5. *C. pycnotherix Trin.* Gram. Unif. 234 (1824) ; Stapf in Dyer, Fl. Cap. 7 : 641 ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 127. Perennial up to 1 ft. high ; stems prostrate, emitting tufts of barren shoots and culms from the rooting nodes.
 French Guinea : Timbo (Aug.) ! N. Nigeria ! S. Nigeria : Bamenda, 5,000 ft. (Jan.) ! Cameroons Mt. : Buea, 3,000 ft. ! Also in French Cameroons, St. Thomas, and widely spread in East Africa, and in Natal ; also in E. Tropical S. America. Exsicc.—Pobeguín 1707. Lely 754. Mailand 21 ; 351. Migeod 91 ; 290. (See Appendix).
6. *C. Prieuri Kunth* Rev. Gram. 1 : 89 ; 2 : 441, t. 134 (1829) ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 126.
 French Sudan : Kabarah (Aug.) ! Sansanding (Sept.) ! Senegal : M'Bidjem ! St. Louis Isl. (Sept.) ! Gambia ! Gold Coast : Accra (Mar.) ! N. Nigeria : Kanwa (Sept.) ! Also in Cape Verde Islands, through the Southern Sahara to E. Sudan. Exsicc.—Chev. 1323 ; 2396 ; 24958. Roger. Skues. Deighton 573. (See Appendix).
7. *C. barbata Sw.* Fl. Ind. Occ. 1 : 200 (1797). *Andropogon barbata* Linn.
 Gold Coast : Takoradi, waste places. Tropics generally. Exsicc.—Deighton 560. Irvine 1015.

Imperfectly known species.

- C. *Rogeoni* A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 129.
 French Sudan : Sikasso. Dahomey : Zagnanado. And in Shari. Exsicc.—Chev. 25595 ; 23054 ; 23092.

33. BRACTEOLA Swallen in Amer. Journ. Bot. 20 : 118 (1933).

Perennial ; culms up to 60 cm. high, sparingly leafy from a dense tuft of basal leaves ; sheaths of the lower leaves with broad membranous margins ; ligule a minute rim ; blades folded, up to 11 cm. long, broadly rounded at the apex and submucronate-emarginate, glabrous except the slightly ciliate base ; spikes 4, digitate, erect, 7-9 cm. long, at length long-exserted from the sheath of the uppermost much reduced leaf ; spikelets 4-5 mm. long ; glumes subequal, broadly oblong-lanceolate, keeled, keel scabrid ; lemma ovate-lanceolate, aristate-acuminate, 3-nerved, nerves long-villous *subaequigluma*

- B. *subaequigluma* Stapf ex A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 127. *B. lucida* Swallen. *Chloris subaequigluma* Rendle.
 Gold Coast : Christianborg (Mar.) ! Also in Angola. Exsicc.—Johnson 1018.

34. BRACHYACHNE Stapf in Hook. Ic. Pl. 31 : sub. t. 3099 ; F.T.A. 7 : 20 (in key).

Annual, densely caespitose ; culms slender, ascending ; leaf-sheaths glabrous, the upper one embracing the base of the raceme ; blades acicular, about 2 cm. long, glabrous ; racemes solitary, spiciform, slender, 4-10 cm. long ; rhachis wavy, nerved on the sides ; spikelets closely imbricate, alternate, appressed, 2-5 mm. long, brown when dry ; glumes subequal, obtuse, keeled, glabrous, longer than the florets ; lemma oblong, widely emarginate, 3-nerved, nerves long-pilose *obtusiflora*

- B. *obtusiflora* C. E. Hubbard in Kew Bull. 1933 : 503 (in note). *Microchloa obtusiflora* Benth.
 N. Nigeria : Mt. Pati, in crevices of rocks ! Also in the Shari-Ubangui region. Exsicc.—Barter 537. Vogel 189.

35. CYNODON Pers.—F.T.A. 9 : 20 (in key).

Culms many-noded, lower internodes very short ; leaf-sheaths tight, glabrous or hairy, bearded at the mouth ; ligule a ciliate rim ; blades linear, acute to pungent, up to 18 cm. long and 3 mm. broad, folded or flat, glaucous-green ; spikes 2-6 in a terminal umbel, up to 7 cm. long ; spikelets 1-flowered, 2-seriate and unilateral on a slender keeled rhachis, about 2-5 mm. long ; glumes lanceolate, subequal *Dactylon*

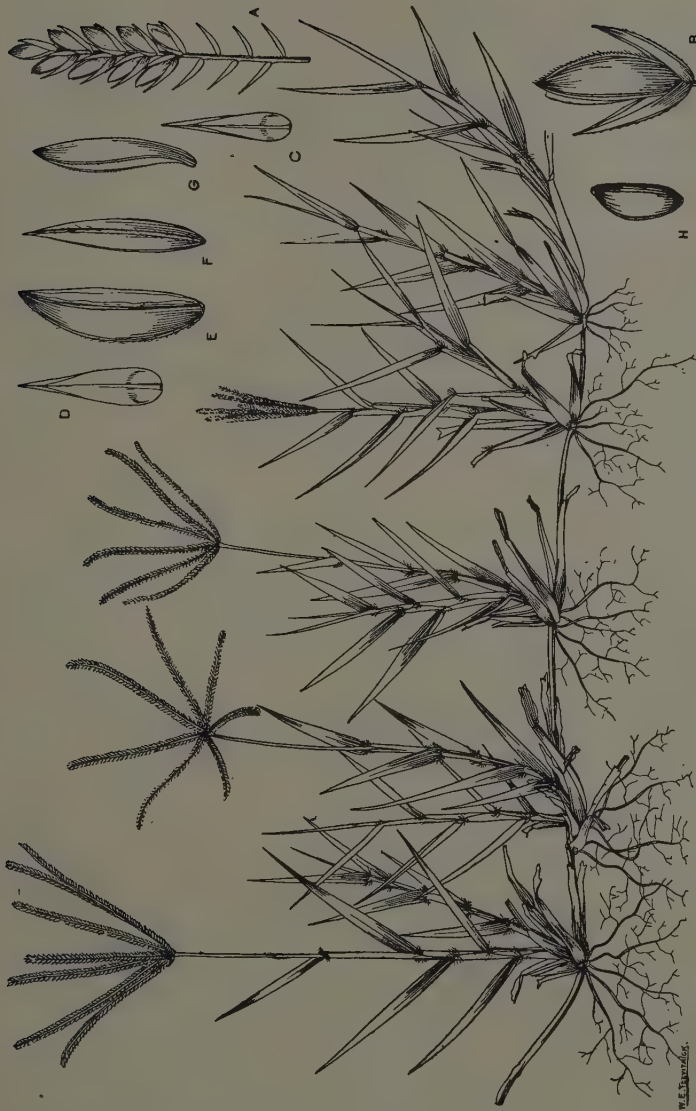


FIG. 356.—*CYNODON DACTYLON Pers.* (GRAMINEAE-CHLORIDEAE).

A, portion of spike with persistent lower glumes. B, spikelet. C, lower glume. D, upper glume. E and F, side and back views of lemma. G, palea. H, grain.

C. Dactylon Pers. Syn. 1 : 85 ; Stapf in Dyer, Fl. Cap. 7 : 634 ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 124. Perennial ; stems creeping, rooting at the nodes and producing from them fascicles of barren shoots and flowering culms.

An almost cosmopolitan grass, variable in habit according to situation. (See Appendix).

36. MICROCHLOA R.Br.—F.T.A. 9 : 20 (in key) ; Fl. Cap. 7 : 635.

Annual ; culms very slender, 1–3-noded, often branched ; leaf-sheaths tight, compressed, keeled, glabrous ; blades up to 3 cm. long, narrowly linear-setaceous, acute, plicate ; spikes solitary, slender, curved, up to 15 cm. long ; rhachis minutely ciliate ;

spikelets 1-flowered, densely compressed, in 1 row, 2-3 mm. long, glabrous; glumes lanceolate-oblong, acute, the lower slightly longer, keeled 1. *indica*
 Perennial; very similar to above but base clothed with fibrous remains of leaf-sheaths
 2. *abyssinica*

1. *M. indica* Beauv. Agrost. sub. t. xx; Hack. in Fedde Report. 7: 373 (1909); Merrill in Philipp Journ. Sci. Bot. 7: 74 (1912); Chev. Rev. Bot. Appl. Agric. Trop. 1934: 123. *Nardus indica* Linn. f. *Microchloa setacea* R.Br.—Fl. Brit. Ind. 7: 283, partly; Fl. Cap. 7: 637, partly.

French Sudan: Mopti (Sept.)! Labezenga (Sept.)! Gourma (July)! N. Nigeria: Jebel Sokoto (Aug.)! S. Nigeria: Lagos, on rocks! Cameroons Mt.: 7,000 ft. (Dec.)! Tropical Africa generally. Exsicc.—Chev. 24554; 24922. *Hagerup* 455. *Barter*. *Dalz.* 499. *Dawodu* 226. *Mann* 2095. (See Appendix).

2. *M. abyssinica* Hochst. ex A. Rich. Tent. Fl. Abyss. 2: 404. Possibly only the perennial state of the preceding species.

N. Nigeria: Naraguta, in crevices on wet rocks (July)! Tropical Africa generally. Exsicc.—Lely P. 434.

37. LEPTURELLA Stapf in Bull. Soc. Bot. Fr. Mem. 8: 222 (1907).—F.T.A. 9: 20
 (in key).

Annual 4-5 cm. high, branched from the base; nodes exserted, about 3; sheaths with hyaline margins, 7-9-ribbed; ligule truncate, ciliate; blade narrowly linear, subacute, 1-2 cm. long, 1 mm. broad, setaceous-plicate, margins with a few long tubercle-based hairs; spikes solitary, spikelets 4-5, more or less immersed in the hollows of the rachis, 1-flowered, lower 2-3 blunt, the next 1 or 2 perfect, 3-3.5 mm. long, the top one reduced to glumes; lower glume of the lateral perfect spikelets broadly ovate, 0.5 mm. long, upper narrowly lanceolate, long acuminate and long-aristate; lemma 3-3.5 mm. long, with an equally long awn *aristata*

L. aristata Stapf l.c. 223; Chev. Bot. 751, and Rev. Bot. Appl. Agric. Trop. 1934: 123.

French Sudan: Mossi, Mt. Zongapignié, near Koupéla, 1,200 ft. (July)! Mossi, Mia to Yako, on plateau (Aug.). Exsicc.—Chev. 24598; 24753.

38. SCHOENEFELDIA Kunth. Revis. Gram. 283, t. 53 (1830).—F.T.A. 9: 20
 (in key).

Annual up to nearly 1 m. high; culms caespitose; lower nodes exserted; leaf-sheaths loose, glabrous; ligule very short, ciliate; blades linear, up to 20 cm. long, tapered to a fine point, thinly pilose on the upper side towards the base; spikes digitate, slender, 2-4, up to 15 cm. long; spikelets densely 2-seriate on one side of the flattened rachis, 1-flowered; glumes subequal, compressed, subulate-acuminate, 2.5-3 mm. long, keels scabrid-pubescent; lemma shortly bifid, terminated by a minutely scabrid slender curved awn about 3 cm. long *gracilis*

S. gracilis Kunth Revis. Gram. 1: 283, t. 53; Chev. Bot. 745, and Rev. Bot. Appl. Agric. Trop. 1934: 122. *S. pallida* Edgew. *Chloris pallida* Hook. f. Fl. Brit. Ind. 7: 289.

French Sudan: Somp (Aug.)! Yatenga Nord, from Bango to Thiou (Aug.)! Gao (Sept.)! Senegal: Borboni Desert (Aug.)! N. Nigeria: Sokoto (Sept.)! Katagum! Extends eastwards to the Eastern Sudan and Abyssinia and in India. Exsicc.—Heudelot 389. *Roger* 52. Chev. 2389; 24875. *Hagerup* 342. *Dalz.* 261; 506. (See Appendix).

39. SPOROBOLUS R.Br. Prod. 169 (1810).—F.T.A. 9: 19 (in key).

Leaves pungent; inflorescence spiciform, dense:

Spikelets 1.5-2 mm. long; perennial; rhizome creeping, stoloniferous; culms many-noded, sheathed nearly all along, the internodes alternately long and short; blades subulate-involute, base narrower than the sheath; panicle 4-5 cm. long; lower glume two-thirds as long as the spikelet, acute; upper glume as long as the spikelet

1. *virginicus*

Spikelets 2.5 mm. long; habit of the last, but branches tufted and leaves often much reduced; panicle up to 15 cm. long, very dense and less than 5 mm. wide; lower glume one-quarter to one-third as long as the spikelet 2. *spicatus*

Leaves not or only slightly pungent; inflorescence usually lax to very lax, rarely subspiciform:

Spikelets very dark green, 5 mm. long, clustered towards the ends of the filiform spreading branches of the inflorescence, acutely acuminate; lower glume lanceolate, half as long as the spikelet; leaves tufted at the base of the culm, linear-subulate and involute, up to 7 cm. long, glabrous 3. *montanus*

Spikelets straw-coloured, green or purplish, mostly evenly distributed along the branches of the inflorescence, never 5 mm. long:

Branches of the inflorescence not verticillate:

Inflorescence usually dense or rather dense, branches or pedicels not filiform:

Glumes as long as the spikelet:

Panicle narrow and more or less spiciform; racemes at most 2 cm. long; leaves very glaucous, rigid 4. *helvolus*

Panicle broader, oblong; racemes 4-6 cm. long; leaves not very glaucous and not rigid 5. *robustus*

Glumes much shorter than the spikelet:

Spikelets very acuminate; glumes very unequal, the lower truncate-jagged at

the apex, the upper pointed, over half as long as the spikelet; spikelets straw-coloured, very acute; panicle linear-oblong, elongated; racemes very short, 1-2 cm. long; leaves short, taper-pointed; leaf-sheaths narrow at the base

6. *Molleri*

Spikelets at most acute:

Glumes dissimilar in shape, the lower rounded at the apex, the upper pointed and twice as long; leaf-sheaths very broad at the base; panicle very narrow, about 10 cm. long, the branches at most about 1 cm. long .. 7. *capensis*

Glumes similar in shape, rounded at the apex; panicle elongated, with rather long branches .. 8. *pyramidalis*

Inflorescence very delicate and lax, with filiform branches and often very slender pedicels:

Spikelets 2 mm. long, very acute:

Lower glume quarter as long as the spikelet, rounded-truncate and jagged at the apex, upper glume a little longer; leaf-blades convolute-setaceous, sheaths long-ciliate at each side of the ligule; panicle much-branched, 15-25 cm. long; annuals .. 9. *myrianthus*

Lower glume one-third as long as the spikelet, lanceolate, acute, upper glume half as long as spikelet; panicle short and ovate in outline up to 8 cm. long; perennial, with persistent leaf-sheaths at the base .. 10. *Stapfianus*

Spikelets less than 2 mm. long, at most subacute:

Perennials; upper glume about half as long as the spikelet; panicle very fine and delicate, with wavy thread-like branches and pedicels; stem-leaves short, setaceous-involute, sharply pointed; leaf-sheaths persistent and becoming fibrous .. 11. *festivus*

Annuals; upper glume much less than half as long as the spikelet:

Glumes subequal in length; spikelets 1 mm. long, narrowly oblong-lanceolate; panicle very delicate and much-branched, with very slender branches and pedicels; leaves short, taper-pointed, glabrous .. 12. *pectinellus*

Glumes very unequal in length:

Spikelets 1.75 mm. long, broadly lanceolate, subacute; panicle delicate, narrowly pyramidal, about 10 cm. long, bipinnately branched; leaves about 3 cm. long, linear-lanceolate from a broad base, glabrous .. 13. *infirmus*

Spikelets 0.75 mm. long, narrowly lanceolate, subacute, green; panicle elongate and narrowly oblong, at first partly embraced by the leaf-sheath, 15-30 cm. long, 5 cm. broad, with numerous very finely capillary branches and pedicels; leaves linear and taper-pointed from a broadish base, up to 25 cm. long .. 14. *minutiflorus*

Branches of inflorescence verticillate; leaves usually bristly pectinate-ciliate:

Perennials:

Spikelets sessile or subsessile, markedly secund, 2.5 mm. long; lower glume half as long as the spikelet; leaves broadly linear, not rounded at the base, densely pectinate-ciliate, up to 25 cm. long; racemes up to 5 cm. long .. 15. *Dinkelagei*

Spikelets pedicellate, 3 mm. long; leaves elongate-linear, rather obscurely or distantly pectinate-ciliate; racemes about 5 cm. long .. 16. *marginatus*

Annuals:

Spikelets 3 mm. long, very acute before opening, purplish; panicle very narrow; lower glume one-third as long as the spikelet; leaves long-tapered from a broad setose-margined base, up to 15 cm. long .. 17. *oxylepis*

Spikelets at most 2 mm. long:

Spikelets 1.5-2 mm. long:

Panicle narrow, oblong or lanceolate:

Grains globose, 1 mm. long; leaves broadly linear, markedly pectinate-ciliate with bulbous-based hairs, up to 13 cm. long and 6 mm. broad; lower glume nearly half as long as the spikelet .. 18. *subglobosus*

Grains ellipsoid:

Spikelets 1.5 mm. long; leaves narrowly lanceolate, very short, up to 4 cm. long, distantly pectinate-ciliate; panicle up to 12 cm. long .. 19. *myxosperma*

Spikelets 2 mm. long, lanceolate, acute, purple, lower glume one-third as long as the spikelet; leaves linear, taper-pointed, up to 15 cm. long, weakly pubescent and ciliate; panicle 10 cm. long .. 20. *patulus*

Panicle ovate in outline, short, at most 6 cm. long; lower glume much reduced and rounded, soon falling off; leaves up to 5 cm. long, shortly setulose-pectinate; racemes barren in the lower half or third .. 21. *coromandelianus*

Spikelets at most 1 mm. long, numerous, mostly purplish, in slender panicles 8-10 cm. long; lower glume almost subulate, half as long as the spikelet; leaves variably pectinate-ciliate, up to 6 cm. long .. 22. *granularis*

1. *Sporobolus virginicus* Kunth Rev. Gram. 1: 57 (1829); Fl. Brit. Ind. 7: 249. *Agrostis virginica* Linn. A. congener Schum. S. *pungens* Kunth Rev. Gram. 1: 68.

Senegal! Ivory Coast: Sassandra (May)! Gold Coast: Labadi, near salt-water lagoon, creeping and



FIG. 357.—*SPOROBOLUS PYRAMIDALIS* P. Beauv. (GRAMINEAE-SPOROBOLAEAE).
 A, ligule. B, portion of branch with spikelets. C, spikelet. D, lower glume. E, upper
 glume. F, lemma. G, palea.

- binding sand (Mar.)! Christianborg (Apr.)! Dahomey: Cotonou (Apr.)! Also in Madras and Ceylon, eastward to Australia and in America. Exsicc.—*Heudelot* 499. *Johnson* 1037. *Deighton* 578. *Chev.* 23475.
2. *S. spicatus* Kunth Revis. Gram. 1: 67 (1829). *Agrostis spicata* Vahl. (1790). *Vilfa spicata* P. Beauv. French Sudan: Somp (Aug.)! Timbuktu (June)! Central Sahara: Silet, 2,500 ft., common around the oases (Mar.)! Senegal: Near Monk (Jan.)! N. Nigeria: shores of Lake Chad, N. Bornu (Dec.)! Extends to E. Sudan, Somaliland, and East Africa. Exsicc.—*Chev.* 2228. *Hagerup* 124. *Chipp* 86. *Roger* 58. *Elliott* 154. (See Appendix).
3. *S. montanus* Engl. in Abh. Preuss. Akad. Wiss. 2: 127 (1891-2). *Vilfa montana* Hook. f. Perennial up to 1 ft. high, covered at the base by the densely overlapping leaf-sheaths. Cameroons Mt.: 7,000-10,000 ft. (Nov.-Dec.)! Exsicc.—*Mann* 2088. *Mildbr.* 10895. *Migeod* 184.
4. *S. helvolus* Dur. & Schinz Consp. Fl. Afr. 5: 820 (1894). *Vilfa helvola* Trin. (1820). *S. glaucifolius* Hochst. *Vilfa glaucifolia* Steud. (1855). French Sudan: Somp (Aug.)! Beragungu! Senegal: Richard Toll (Feb.)! Togo: near Lome! N. Nigeria: near Gummari, etc. (Oct.)! Ngala (Oct.)! Extends to Arabia. Exsicc.—*Chev.* 2229. *Hagerup* 314. *Leprieux*. *Dollinger* 20. *Warnecke* 316. *Golding* 38. *Gwynn* 115. (See Appendix).
5. *S. robustus* Kunth Revis. Gram. 2: t. 126 (1829). *Vilfa robusta* Trin. Senegal: Maures Coast (Feb.)! Liberia: Grand Bassa (July)! Mostly maritime coasts of Tropical Africa and Cape Verde Islands. Exsicc.—*Dollinger*. *Vogel* 31. (See Appendix).
6. *S. Molleri* Hack. in Bol. Soc. Brot. 5: 213 (1887). Cameroons Mt.: Buea, 3,000 ft. (Jan. and July)! Also in St. Thomas, East Africa, Congo and Rhodesia. Exsicc.—*Mailand* 23; 349. *Migeod* 101.
7. *S. capensis* Kunth Enum. Pl. 1: 212. Perennial about 1½ ft. high, with very broad leaf-sheaths and narrow panicle. Cameroons Mt.: near Uyanga Camp, 7,500 ft. (Jan.)! Extends through the higher parts of East Africa to South Africa. Exsicc.—*Mailand* 927.
8. *S. pyramidalis* P. Beauv. Fl. Owar. & Benin 2: 36, t. 80 (1807). *Agrostis owarensis* Schult. (1824). *Vilfa pyramidalis* Steud. Widely distributed throughout the area; possibly not distinct from *S. indicus* R.Br., from tropical America. (See Appendix).
9. *S. myrianthus* Benth. in Hook. Nig. Fl. 565 (1849). N. Nigeria: Mt. Pati (Sept.)! Exsicc.—*Vogel* 190.
10. *S. Staphanus* Gandoger in Bull. Soc. Bot. Fr. 66: 302 (1920). *S. festivus* var. *stuppeus* Stapf. *S. stuppeus* Stent. N. Nigeria: Top of Zaramda Mt., 5,800 ft. (May)! Extends to Eastern Sudan, Somaliland south to South Africa (N. Transvaal and Natal). Exsicc.—*Lely* 196.
11. *S. festivus* Hochst. ex A. Rich. Tent. Fl. Abyss. 2: 398 (1851). *Vilfa festiva* Steud. French Guinea: Kouroussa (Aug.-Sept.)! Gold Coast! N. Nigeria: various localities! S. Nigeria: Lagos (May)! "Cameroons"! Widely distributed in tropical Africa. Exsicc.—*Pobéguin* 515; 1095. *Beale* 37. *Dalton*. *Barter* 1392. *Dal.* 253; 563. *Lely* 296; 764. *Denton* 30. *Unwin* 9753.
12. *S. pectinellus* Mez in Fedde Repert. 17: 295. French Guinea: Kouroussa (Sept.)! S. Nigeria: Lagos! Exsicc.—*Pobéguin* 506. *Dawodu* (*Macgregor*) 47; 140.
13. *S. infirmus* Mez in Fedde Repert. 17: 294. N. Nigeria: Jebba, on the Niger! Also in Ubangui-Shari. Exsicc.—*Barter*.
14. *S. minutiflorus* Link Hort. Berol. 1: 88 (1827). *Vilfa minutiflorus* Trin. French Guinea: Konakry, grass on roads (Jan.)! Exsicc.—*Dal.* 8418; 8419.
15. *S. Dinklagei* Mez in Fedde Repert. 17: 298. Sierra Leone: near Mange Bureh, dry roadside (Jan.)! near Serabu (Apr.)! Newton (Nov.)! Mabould (Oct.)! Bonietta (Nov.)! Njala (May)! Freetown! Liberia: Banga (Oct.)! Grand Bassa (Nov.)! Exsicc.—*Deighton* 659; 1012; 1677; 1420; 1459; 2003. *Glanville* 81. *Linder* 1208. *Thomas* 3618; 5369. *Dinklage* 2281.
16. *S. marginatus* Hochst. ex A. Rich. Tent. Fl. Abyss. 2: 397. Perennial, 2-3 ft. high, with a panicle about 35 cm. long. N. Nigeria: Lokoja, on a spur of Mt. Pati (Oct.)! Extends through the Shari to N.E. and East Tropical Africa. Exsicc.—*Dal.* 294.
17. *S. oxylepis* Mez in Fedde Repert. 17: 298 (1921). Erect, 2½ ft. high, near water. N. Nigeria: Naraguta (Aug.)! Also in S. Tanganyika and the plains of Zomba, Nyasaland. Exsicc.—*Lely* P. 448.
18. *S. subglobosus* Stapf MS. Gold Coast! N. Nigeria: Nupe, open plains! Exsicc.—*Beale* 37a. *Barter* 1395.
19. *S. myxosperma* Stapf MS. N. Nigeria: Attah (Sept.)! Exsicc.—*Vogel* 89.
20. *S. patulus* Hack. in Oester. Bot. Zeitschr. 1902: 58. French Guinea: Timbo, cultivated ground! Sierra Leone: Hill Station, bush paths, common (Oct.)! Also in Madagascar. Exsicc.—*Pobéguin* 1719. *Deighton* 167. *Thomas*.
21. *S. coromandelianus* Kunth Revis. Gram. 1: 681; Fl. Brit. Ind. 7: 252. French Sudan: Ausongo (Sept.)! Senegal! Also in India. Exsicc.—*Hagerup* 390. *Roger* 13.
22. *S. granularis* Mez in Fedde Repert. 17: 297. *S. regularis* Mez. French Sudan: Koulikoro (Oct.)! Senegal! N. Nigeria: Sokoto (Oct.)! Also in French Cameroons. Exsicc.—*Chev.* 2223. *Heudelot* 440. *Moiser* 151. *Baikie*.

40. KOELERIA Pers. Syn. 1: 97 (1805).—Domin Monogr. in Bibliotheca Botanica Heft 65 (1907).

Tufted; leaf-sheaths and blades softly pilose; blades strongly nerved, convolute or flat, up to nearly as long as the culms; panicles spiciform, dense, not or hardly interrupted, 4-9 cm. long, 8-10 mm. diam.; straw-coloured or purplish; peduncle softly tomentose towards the top; spikelets 1-3-flowered, about 7 mm. long; glumes slightly unequal, lanceolate, acute *convoluta*

K. convoluta Hochst. in Steud. Pl. Glum. 1: 293 (1855); *K. convoluta* vars. *typica* and *uniflora* Domin l.c. 110. Cameroons Mt.: 8,000-12,000 ft. (Dec.-Jan.)! Also at high altitudes in the East African Mountains from Abyssinia to S. Tanganyika. Exsicc.—*Mann* 1357; 2074. *Mailand* 1259; 1297.

41. DANTHONIA DC.—F.T.A. 9: 17 (in key); Fl. Cap. 7: 516.

Perennial or annual, loosely tufted; culms clothed at the base with straw-coloured or pale softly hairy to glabrescent cataphylls; upper leaf-sheaths firm, the nodes villous; ligule densely ciliate; blades linear-lanceolate to lanceolate, pungent, up to 6 cm. long, tomentellous; panicle dense, mostly partially enveloped by the large

leaf-sheath, up to 20 cm. long ; spikelets 7-8 mm. long, mostly pale straw-coloured ; glumes subequal, acute, prominently 7-9-nerved, minutely scabrid, as long as the spikelet *Forskali*

- D. Forskali** *R. Br.* in Denham & Clapperton Narr. Trav. North and Centr. Afr. App. 244 (1826) ; Chev. Bot. 744, and Rev. Bot. Appl. Agric. Trop. 1934 : 44. *Avena Forskali* Vahl. *Trisetum Forskali* Beauv. French Sudan : between Ouakata and Nema, north-east of Timbuktu (coll. ?—Comm. Jumelle 1). Also from Mauritania, extending across N. Africa to Eastern Sudan, Palestine and Arabia, and in Angola. (See Appendix).

42. PENTASCHISTIS Stapf—F.T.A. 9 : 17 ; Fl. Cap. 7 : 480.

Perennial, densely tufted ; leaf-sheaths overlapping, striate, bearded at the mouth ; ligule a densely ciliate rim ; blade narrowly setaceous-linear, with a hard tip, tightly involute, up to 10 cm. long, glabrous and smooth except for the scaberulous margins ; panicle narrow and dense, 2.5-8 cm. long ; spikelets 6-7 mm. long ; glumes equal, lanceolate in profile, acuminate, thin, 1-nerved, keel scaberulous ; lemma bearing on the inside a fine bristle 2-3 mm. long *Mannii*

P. Mannii Stapf, MS.

Cameroons Mt. : 9,000-13,500 ft. (Nov.-Feb.) ! Exsicc.—*Mann* 1351 ; 2075. *Dalz.* 8353. *Maitland* 878 ; 1244 ; 1249 ; 1280. *Migeod* 186 ; 197. *Mildbr.* 10894. *Johnston* 47. *Steele* 34.

This may be the same as one of the species on the East African Mountains, but it seems better for the purposes of this Flora to use Stapf's MS. name than to make a wrong determination.

43. STREBLOCHAETE Hochst. ex Pilger in Engl. Bot. Jahrb. 37 : Beibl. No. 85 : 61 (1906).

Culms several-noded, glabrous ; leaf-sheaths keeled upwards, strongly nerved, auricled at the mouth ; ligule up to about 1 cm. long, hyaline, lacerate ; blades narrowly linear-lanceolate, narrowed to the base, tapered to a fine point, up to 23 cm. long and 1 cm. broad, closely nerved ; panicle slender, narrow ; spikelets narrow, green, 1.6-2.5 cm. long ; glumes slightly unequal, with hyaline margins, lower 3-nerved, upper 5-nerved ; awns flexuous, becoming entangled with others, up to 4 cm. long *longiarista*

S. longiarista *Pilger* in Notizbl. Bot. Gart. Berlin 9 : 516 (1926). *Trisetum longiaristum* A. Rich. A loosely tufted perennial up to 3 ft. high.

Cameroons Mt. : 8,000 ft. ! Nyanga Camp, in shade, 7,600 ft. ! Jonjo, in forest, 7,600 ft. ! Mann's Spring, 7,800 ft. ! Onyanga, 8,100 ft. ! Also in Abyssinia and East Africa, south to Nyasaland. Exsicc.—*Mann* 2077. *Maitland* 929 ; 1335. *Steele* 67 ; 95.

44. HELICTOTRICHON * Bess. ex Schult. Mant. Syst. Veg. 2 : Addit. 1 : 526 (1827). (*Avenastrum*—F.T.A. 9, 1 : 17, in key).

Lower glume 3.5-5 mm. long ; upper glume 5-8 mm. long ; florets 3-4, long-exserted from the glumes ; spikelets 1.4-1.8 cm. long, green, arranged in a narrow slender panicle ; leaf-blades broadly linear, acute, up to 30 cm. long and 10 mm. broad, mostly thinly and sparsely pubescent on the distinct nerves ; glumes with hyaline margins ; awn geniculate from the upper third of the lemma, about 1.3 cm. long *Mannii*

Lower glume 5-12 mm. long ; upper glume 7-14 mm. long ; florets 2-3, mostly shortly exserted ; spikelets 0.8-1.6 cm. long :

Internodes of the rachilla 3-4 mm. long ; panicle linear ; spikelets green ; leaf-blades as above ; glumes minutely scaberulous on the nerves ; awn from between the middle and upper third of the lemma *2. Maitlandii*

Internodes of the rachilla 2-3 mm. long ; panicle rather broader and coarser than in the other two species, the spikelets green or purplish ; leaf-blades narrowly linear ; awn from about the middle of the lemma *3. rigidulum*

1. **H. Mannii** *C. E. Hubbard* in Kew Bull. 1936 : ined. *Avenastrum Mannii* *Pilger*. *Trisetum lachnanthum* Hook. f., not of Hochst. *Avena lachnantha* Hook. f. partly. Perennial up to 4 ft. high, culms 4-7-noded ; leaf-sheaths longer than the internodes.

Cameroons Mt. : 6,000-9,000 ft. (Dec.-Feb.) ! Fernando Po : Clarence Peak, 7,000-9,000 ft. ! Exsicc.—*Maitland* 855 ; 1338. *Mann* 657 ; 1476 ; 2020 ; 2089. *Dunlap* 43. *Preuss* 717.

2. **H. Maitlandii** *C. E. Hubbard* in Kew Bull. 1936 : ined. Perennial up to 4 ft. high, culms 3-5-noded ; sheaths longer than the internodes.

S. Nigeria : Bamenda ; Lakom, on grass covered plateau, 7,000 ft. (May) ! Exsicc.—*Maitland* 9A.

3. **H. rigidulum** *C. E. Hubbard* in Kew Bull. 1936 : ined. A tufted perennial up to 5 ft. high, culms 3-4-noded, upper internodes exserted.

Cameroons Mt. : grasslands, 6,700-10,000 ft. (Nov.-Feb.) ! Exsicc.—*Mann* 1347 ; 1355 ; 2068. *Maitland* 639 ; 873 ; 965 ; 1039 ; 1222. *Steele* 50 ; 54. *Mildbr.* 10849. *Migeod* 172. *Johnston* 44 ; 45. *Preuss* 1024.

45. DESCHAMPSIA Beauv. Agrost. 91, t. 18, fig. 3 (1812).—F.T.A. 9 : 17 (in key).

Leaf-blades flat, 4-5 mm. broad, up to 60 cm. long, asperulous below, very scabrid on the ridges above ; awn not projecting beyond the glumes ; spikelets pale, 4-5 mm. long ; lemmas 3-3.5 mm. long, awned from near the base 1. *caespitosa* var. *Mannii* Leaf-blades tightly involute or plicate-involute, 0.75-1 mm. diam. ; awn projecting

* See note, p. 496.



FIG. 358.—*DESCHAMPSIA MILDBRAEDII* Pilger (GRAMINEAE-AVENEAE).

A, plant. B, section of leaf. C, spikelet. D, rhachilla. E, floret. F, lemma. G, palea. H, lodicules. I, stamens and pistil. J, pistil.

beyond the glumes; spikelets 4-8 mm. long, green or purplish; lemmas 4-5 mm. long, awned from near the base 2. *Mildbraedii*

1. *D. caespitosa* var. *Mannii* C. E. Hubbard in Kew Bull. 1936: ined. *D. caespitosa* Hook. f. in Journ. Linn. Soc. Bot. 6: 23, not of Beauv.
Fernando Po: Clarence Peak, 9,000-10,000 ft. ! Exsicc.—Mann 322; 1464.
2. *D. Mildbraedii* Pilger in Notizbl. Bot. Gart. Berlin 19: 769 (1929). A densely tufted perennial with numerous intravaginal innovations; culms up to 4 ft.
Cameroons Mt.: 9,000-13,300 ft. (Nov.-Feb.) ! Exsicc.—Migeod 171; 192. Mann 2073. Dalz. 8350; 8354. Maitland 867; 1246; 1272. *Mildbr.* 10910.

46. *AIRA* Linn.—F.T.A. 9: 17 (in key).

Annual; stems tufted, very slender, up to 30 cm. high; leaf-sheaths loose, minutely scaberulous on the nerves; ligule very large and conspicuous, up to 8 mm. long, hyaline, acute; blades very narrow, subsetaceous, the lowest up to 5 cm., the upper very short, strongly nerved, nerves scaberulous; panicle delicate, up to 8 cm. long, with filiform branches; pedicels up to 6 mm.; spikelets ovate, 3 mm. long; glumes submembranous; lemmas usually both awned *caryophyllea*

A. *caryophyllea* Linn. Sp. Pl. 66 (1753); Fl. Cap. 7: 463.

Cameroons Mt.: 7,000-12,000 ft. (Dec.-Jan.) ! A common European grass now widely distributed. Also in the mountains of East Africa and in S. Africa. Exsicc.—Mann 1356; 2076. Maitland 868; 960; 1228; 1274. *Migeod* 174. *Mildbr.* 10908.

Mr. Hubbard considers this to be slightly different from the ordinary form, probably due to its isolation.

47. *AGROSTIS* Linn.—F.T.A. 9: 18 (in key).

Lemma pilose; spikelets 4-5 mm. long; culms rather stiff, leafy; sheaths tight, closely ribbed; ligule membranous, broadly triangular, 3 mm. long, becoming jagged; blades linear, up to 25 cm. long, flat or convolute, minutely scabrid on the close nerves, points setaceous; panicle at length exserted from the uppermost sheath, oblong to pyramidal, up to 15 cm. long; branches capillary, opposite or fasciculate, scabrid; glumes subequal, lanceolate, keeled, scabrid on the keel, acute; awn nearly basal, about 5 mm. long 1. *Mannii*

Lemma glabrous; culms slender, 2-3-noded; sheaths finely scabrid; ligule becoming jagged; blades linear, up to 30 cm. long and 3 mm. broad, closely nerved, scaberulous; panicle exserted, dense and spike-like, about 17 cm. long; branches mostly 2-nate, erect, bare in the lower part; glumes subequal, acute, scabrid on the keel; awn towards the base, up to 5 mm. long 2. *congesta*

1. *A. Mannii* Stapf in Dyer Fl. Cap. 7: 549, in obs. (1899). *Deyeuxia Mannii* Hook. f. *Calamagrostis Mannii* Engl. Densely tufted perennial up to 3 ft. high, with delicate open panicles of often purplish spikelets.
Cameroons Mt.: 6,700 ft. to the summit (Dec.-Feb.) ! Fernando Po: 8,500 ft. ! Exsicc.—Dunlap 218. Maitland 928; 1033; 1219; 1280. Mann 1350; 1469; 2096. Steele 52; 100.
2. *A. congesta* C. E. Hubbard in Kew Bull. 1936: ined. Perennial up to 3 ft. high, with contracted stiff panicles of greenish spikelets.
Cameroons Mt.: 7,600-10,000 ft., in grassland. Exsicc.—Mann 2086. Maitland 1034.

48. *HYPSEOCHLOA* * C. E. Hubbard in Kew Bull. 1936: ined.

Spikelets cleistogamous, 3 mm. long, scattered, at length gaping; culms very slender tufted; sheaths loose, ribbed; ligule membranous, narrowly triangular, 2-5 mm long, jagged at the apex; blades linear-setaceous, acute, up to 8 cm. long, strongly nerved, smooth; inflorescence a delicate panicle, exserted, 5-10 cm. long; branches and pedicels capillary, smooth; glumes boat-shaped, equal, acutely acuminate, as long as the spikelet, the slight keel smooth; awn 2-3 times as long as the spikelet, geniculate in the middle, the bristle spreading at a right angle. *cameroonensis*

H. *cameroonensis* C. E. Hubbard l.c.

Cameroons Mt.: above Buea, 8,500 ft. (Dec.) ! Towards No. 3 hut, among rock and boulders, 12,000 ft. (Jan.) ! Exsicc.—*Mildbr.* 10881. Maitland 874; 1274A.

49. *HELEOCHLOA* Host—F.T.A. 9: 18 (in key); Hook. f. Fl. Brit. Ind. 7: 235.

Annual; stems prostrate, radiating from the root; leaf-sheaths very broad, strongly nerved, membranous on the margin and ciliate, embracing the inflorescence; ligule a ring of hairs; blade short, strongly nerved, acute; spikelets densely crowded into a sessile ovoid or ellipsoid head up to 2 cm. long; glumes 1-nerved, shortly ciliate on the keel *schoenoides*

H. *schoenoides* Host Gram. Austr. 1: 23, t. 30; Hook. f. l.c. *Phleum schoenoides* Linn. *Cryptis aculeata* A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 111, not of Ait. *C. compacta* Steud.

Senegal: St. Louis ! French Sudan: Niakunfé, near the Niger. Also in Europe, the Libyan Desert, and N.E. Tropical Africa, Portuguese East Africa and Madagascar; also in N. India and China. Exsicc.—*Leprieux*. Roger 31. *Rogeon*.

50. *ALOPECURUS* Linn.—F.T.A. 9: 18 (in key).

Culms weak, about 4-noded, up to 35 cm. long, nodes long-exserted, glabrous; leaf-sheaths very loose, about half as long as the internodes, strongly nerved, smooth;

* See note, p. 496.

ligule membranous, about 3 mm. long; blades up to 15 cm. long, 3-4 mm. broad, ending in a callous subacute point, with slender minutely scabrid nerves and margins; panicle spiciform, cylindric, 7-8 cm. long, about 6 mm. diam.; spikelets pedicellate; glumes awnless, subequal, 7 mm. long, 2-nerved, oblong-lanceolate, scabrid on the margin towards the tip; awn nearly twice as long as the spikelet *myosuroides*

- A. *myosuroides* Huds. Fl. Angl. 23 (1762). *A. agrestis* Linn.
Senegal: without loc. ! Widely distributed. Exsicc.—Roger 32.

51. POLYPOGON Desf.—F.T.A. 9: 18 (in key); Fl. Cap. 7: 543.

Annual, tufted; culms 3-4-noded, nodes mostly well exserted; leaf-sheaths loose, smooth or minutely scabrid; ligule very large and conspicuous, membranous, jagged, 5-7 mm. long; blades up to 15 cm. long and 7 mm. broad, broadly linear, tapered to a callous point, minutely scabrid; panicle spike-like, cylindric or sometimes with short branches, up to 8 cm. long, pale green; lateral pedicels very short, disarticulating; spikelets 2 mm. long, narrow; glumes subequal, narrowly lanceolate, emarginate, pubescent, awned, awn about 5 mm. long .. *monspeliensis*

- P. *monspeliensis* Desf. Fl. Atlant. 1: 67; Fl. Cap. 7: 543; Beauv. Agrost. 17, t. vi. fig. 8; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 45. *Alopecurus monspeliensis* Linn.
Central Sahara: Silet, on bank of irrigation ditch, 2,500 ft. (Mar.) ! Widely distributed. Exsicc.—Chipp 73.

52. STIPA Linn. Sp. Pl. 78 (1753).

Panicle spike-like and embraced at the base by the uppermost leaf-sheath, the latter large, tumid, and membranous towards the margin; leaf-blades linear, tapered to a fine point; glumes very narrow, linear, long-acuminate, whitish and hyaline, rather unequal, about 2 cm. long; awns very long and intertwined, geniculate in the middle, strongly twisted below and hispidulous 1. *tortilis*

Panicle loose and slender, soon exserted from the leaf-sheath; leaf-blades very narrow and involute, rigid; glumes very unequal, the lower nearly twice as long as the upper, not white; awns very long and slender, glabrous 2. *parviflora*

1. *S. tortilis* Desf. Fl. Atlant. 1: 99, t. 31, fig. 1.—Fl. Cap. 7: 572; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 110; Maire in Mém. Soc. Hist. Nat. Afr. Nord. 1933: 63 (*S. retorta* Cav.).
Central Sahara: Hoggar Mts.: various localities. Common throughout the Mediterranean and in S. Africa.

2. *S. parviflora* Desf. Fl. Atlant. 1: 98, t. 29; A. Chev. l.c.; Maire l.c.
Central Sahara: Hoggar Mts.: various localities. Distributed from Spain and N. Africa to Egypt and Arabia.
Chevalier (l.c.) also records *Stipa prolifera* Steud. from Tassolé, Afr (No. 42984). I have not seen this or an example of the species, which was described from an imperfect specimen collected by Kotschy in Nubia.

53. *ARISTIDA* Linn. Sp. Pl. 82 (1753).—F.T.A. 9: 18 (in key); Henrard Monograph of the genus *Aristida* (Mededeel. Rijks Herb. Leiden, Nos. 58 (1929) and 58A (1932). (See Appendix).

KEY TO SECTIONS.

Lemma or its prolongation (column) to the awns not articulated; lateral awns well developed, much shorter than the central but similar in structure; column present or absent, sometimes a short beak I. *CHAETARIA*

Lemma or column of awns articulated, the articulation sometimes at the top of the column below the branches of the awn:

Awns never plumose; column of awns well developed or absent:

Lemma not produced into a column, the body of the lemma immediately passing into the three awns II. *PSEUDOCOAETARIA*

Lemma prolonged into a more or less twisted column or beak:

Articulation at the base of the column III. *ARTHERATHERUM*

Articulation at the top of the column, just below the awns

IV. *PSEUDARTHERATHERUM*

Awns, at least the central one, always plumose; column more or less developed and articulated at the junction with the lemma V. *STIPAGROSTIS*

Sect. I.—*CHAETARIA*

Panicle loose and delicate, not secund; awns comparatively short; glumes mauve or purplish; leaves setaceous, involute:

Annual with loose delicate panicles of small mauve spikelets on capillary branches; glumes glabrous, lower 2.5 mm., upper 3 mm. long; awns up to 5 mm. long

1. *Cumingiana*

Perennial, densely tufted, clothed at the base by the often burnt leaf-sheaths; panicles as above; glumes glabrous, lower 3 mm., upper 5 mm. long; awns about 7 mm. long 2. *recta*

Panicle dense, narrow, and more or less secund; awns 1.5 cm. long, equal; glumes mostly greenish, lower 6 mm., scabrid on the keel, upper 7.5 mm. long, smooth on the keel; annual 3. *adscensionis*

Sect. II.—PSEUDCHAETARIA

- Panicle dense and continuous, spike-like, 10–12 cm. long, the branches and pedicels always very short and the spikelets fasciated; glumes long-awned; internodes and leaf-sheaths densely but very shortly pubescent; blades glaucous-green, flat, up to 15 cm. long and 6 mm. broad, strongly nerved 4. *hordacea*
- Panicle loose, with slender branches up to 10 cm. long and naked in the lower part, about 15 cm. long; internodes and leaf-sheaths glabrous; leaf-blades narrow, more or less convolute upwards, ending in a setaceous point, very closely nerved 5. *Kunthiana*

Sect. III.—ARTHATHERUM

- Lower glume always longer than the upper, the former 20–30 mm. long, the latter 3–5 mm. shorter; auricles of leaf-sheaths bearded with long weak hairs, blades very narrowly linear, thinly pilose with long hairs; lemma with a tuft of white hairs at the base; column of awns twisted, up to 4.5 cm. long, awns subequal, about 4.5–5 cm. long 6. *funiculata*
- Lower glume shorter than the upper, or glumes equal:
- Callus with a bifid prolongation:
- Annual; glumes long-awned, the lower 2 cm., the upper 3 cm. long; leaf-blades filiform; panicle narrow, with interlacing persistent awns 7. *Kerstingii*
- Perennial; glumes at most mucronate, the lower up to 7 mm., the upper 15–20 mm. long; leaf-blades narrow, involute; panicle rather diffuse, the awns soon falling off 8. *stipoides*
- Callus conical, acute, not bifid:
- Column of awns more than 20 mm. long; spikelets becoming golden-yellow; glumes unequal, the lower 22 mm., the upper 32 mm. long, both awned 9. *pallida*
- Column of awns less than 20 mm. long:
- Glumes nearly equal, shortly awned, the larger up to 17 mm. long 10. *longiflora*
- Glumes unequal, rather long-awned, the larger 7–8 mm. long, bifid; panicle lax, the spikelets bunched at the ends of short branches 11. *longeradiata*

Sect. IV.—PSEUDARTHATHERUM

- Column of awns straight, not twisted, very short, scabrous, scarcely 2 mm. long; glumes equal, about 6 mm. long, shortly awned; panicle long-exserted, very lax, pyramidal, 10–15 cm. long; spikelets nearly sessile, yellowish; leaf-blades narrow, linear, very acute, convolute, 3–5 cm. long 12. *nigritiana*
- Column of awns twisted, 7–10 mm. long; glumes unequal, lower 5–6 mm. long, shortly awned; panicle long-exserted, with solitary branches up to 7 cm. long, with the spikelets congested at the tops forming often curved false spikes; leaf-blades linear, up to 10 cm. long, more or less convolute 13. *mutabilis*
- Column of awns twisted, 2–3 mm. long; glumes very unequal, lower 5 mm. long, acute or shortly awned, upper 7–8 mm. long, shortly awned or mucronate from a bifid apex; panicle 5–8 cm. long, with mostly solitary short branches; leaf-sheath auricles bearded with long hairs, blades rigid and acicular, convolute, about 4 cm. long, glaucous-green 14. *meccana*

Sect. V.—STIPAGROSTIS

- All the awns plumose with long spreading hairs, glabrous towards the tips, about 1 cm. long; leaf-sheaths longer than the internodes; ligule a densely ciliate rim, auricles shortly bearded; blades rigid, subulate, pungent, 10–30 cm. long; panicle rather dense, linear-oblong, 20–25 cm. long; spikelets straw-coloured; glumes subequal, 1.3 cm. long, very acute; lemma strongly 3-nerved 15. *pungens*
- Only the central awn plumose, the lateral smooth or at most adpressed-ciliate-pubescent:
- Lower internodes very hairy; central awn without a tuft of hairs at the base:
- Internodes woolly-tomentose; densely caespitose, up to 30 cm. high; leaf-blades narrowly convolute, with a pungent tip, scarcely 1 mm. broad, up to 10 cm. long 16. *plumosa*
- Internodes appressed-silky; roots thick, woolly; caespitose; leaf-blades narrowly convolute, 5–6 cm. long, acute 17. *acutiflora*
- Lower internodes not woolly, at most minutely puberulous; leaf-blades linear, involute, up to 15 cm. long; leaf-sheath-auricles bearded with long slender hairs; panicles up to 15 cm. long, loose, well-exserted, slender; glumes slightly unequal, about 8–9 mm. long, 3-nerved; central awn up to 3 cm. long, sometimes mauve, with a dense tuft of hairs at the base 18. *papposa*

1. *Aristida Cumingiana* Trin. & Rupr. in Mém. Acad. Pétersb. Ser. VI. 7. 141 (1849); Henrard, Monogr. *Aristida* 159, pl. lxii.
French Guinea: Kouroussa (Dec.)! Sierra Leone: Benekoro (Nov.)! N. Nigeria: Borgu, open plains!
Extends eastwards as far as China and the Philippines. Exsicc.—*Pobéguin* 542. *Glanville* 322. *Barter* 1394.
2. *A. recta* Franch. in Bull. Soc. Hist. Nat. Autun, 8: 365 (1895); Henrard, Monogr. *Aristida* 261, pl. cxv.
Perennial up to about 1½ ft. high, with delicate panicle of small purple spikelets.

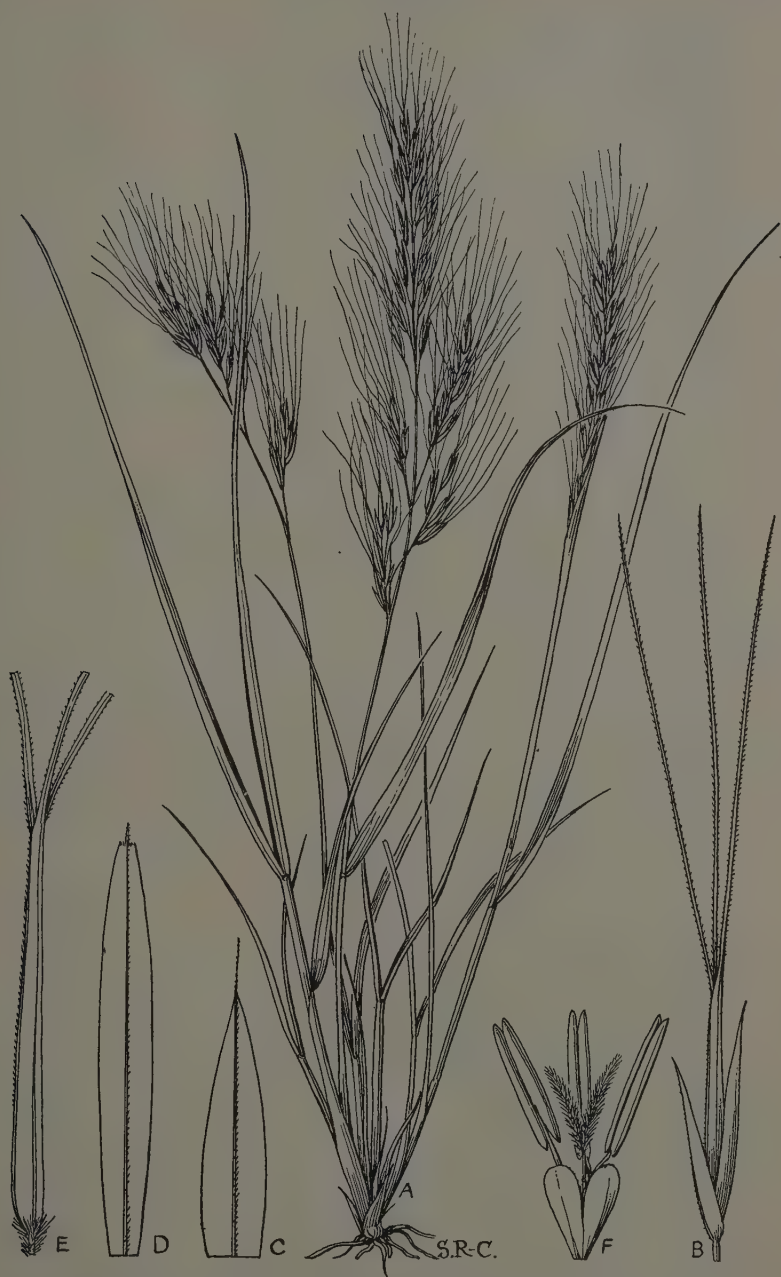


FIG. 359.—*ARISTIDA ADSCENSIONIS* Linn. (GRAMINEAE-STIPEAE).

A, plant. B, spikelet. C, lower glume. D, upper glume. E, floret. F, flower.

- French Sudan: Balandougou (Feb.)! Sierra Leone: Common on alluvium of Niger at Farana! N. Nigeria: Abinsl, abundant in the bush (Mar.)! Also in the Shari and Belgian Congo. Exsicc.—Chev. 324. *Sc. Elliott* 5332. *Dalz.* 875.
3. *A. adscensionis* Linn. Sp. Pl. 82 (1753).—Fl. Cap. 7: 554. *A. submucronata* Schum. *A. festuoides* Poir. *A. guineensis* Trin. & Rupr. *A. Thoningii* Trin. & Rupr. Common in dry localities throughout the area and in most dry and hot countries.
4. *A. hordacea* Kunth Rev. Gram. 2, t. 173; Henrard Monogr. Aristida 140, pl. liv. Senegal: Dakar, on dry cliff (Jan.)! N. Nigeria! Tropical Africa generally. Exsicc.—Hagerup 783. *Lely* 763.
5. *A. Kuntbiana* Trin. & Rupr. in Mém. Acad. Pétersb. Ser. VI. 5: 151 (1849); Henrard Monogr. Aristida 142, pl. liv. Senegal! Exsicc.—Roger.
6. *A. funiculata* Trin. & Rupr. l.c. 7: 159 (1849); Henrard Monogr. Aristida 90, pl. xxiv. French Sudan: Sahel desert! Macina (July–Sept.)! Bamba (Sept.)! Goundam (Aug.)! Eastward to Arabia. Exsicc.—Leclercq 42655. Chev. 2371; 24956. Hagerup 325.
7. *A. Kerstingii* Pilger in Engl. Bot. Jahrb. 34: 127 (1904); Henrard Monogr. Aristida 91, pl. xxv. *A. pilica-polonica* Mez. Senegal! N. Nigeria: Jebba! Bauchi Plateau! Exsicc.—Heudelot 306. Barter 753A. *Lely* 762.
8. *A. stipoides* Lam. Encycl. 1: 157 (1791); Henrard Monogr. Aristida 93, pl. xxvi. French Sudan: between Sansanding and Segou (Sept.)! Senegal: Dakar! Senegal River! N. Nigeria: Kauwa (Oct.)! Katagum, common in the bush! Kworra, south of Sokoto, common! Sokoto (Oct.)! Extends to N.E. and East Africa. Exsicc.—Chev. 2375. Roger. Howard. Heudelot 307. Farmer 17A. Guyon 125; 128. *Dalz.* 292. Palmer 14. Moiser 148.
9. *A. pallida* Steud. Syn. Pl. Gram. 143 (1855); Henrard Monogr. Aristida 107, pl. xxxv. French Guinea! French Sudan! Dahomey! Togo! N. and S. Nigeria. Extends to Nubia. Exsicc.—Pobégnin 550. Hagerup 106. Chev. 1228. Warnecke 168. Palmer 15. *Dalz.* 296; 1126.
10. *A. longiflora* Schum. & Thonn. Beskr. Guin. pl. 48; Henrard Monogr. Aristida 114, pl. xli. *A. leiocalycina* Trin. & Rupr. According to Henrard, distributed from S. Tunis and Senegambia to Gold Coast, Togo and Cameroons. Exsicc.—Hagerup 491.
11. *A. longeradiata* Steud. Synop. Pl. Glumac. 140. Senegal! Exsicc.—Leprieur.
12. *A. nigritiana* Hack. in Fedde, Repert. 10: 166 (1911); Henrard, Monogr. Aristida 127, pl. xlvii. French Sudan: valley of the middle Niger. Exsicc.—Gironcourt.
13. *A. mutabilis* Trin. & Rupr. in Mém. Acad. Pétersb. Ser. VI. 7: 150 (1849); Henrard Monogr. Aristida 136, pls. II–III. *A. tenuiflora* Steud. A short straggling grass. French Sudan: Sahel desert! Timbuktu (Aug.)! between Oualata and Nelsa! N. Nigeria: Kauwa (Oct.)! Katagum, common in bush! Extends to Abyssinia and Somaliland. Exsicc.—Leclercq 42658; 42718. Hagerup 240. *Jumelle* 4. Guyon 126. Leprieur. *Dalz.* 290.
14. *A. meccana* Hochst. ex Trin. & Rupr. l.c. 162 (1849); Henrard Monogr. Aristida 135, pl. II. Densely tufted annual up to 6 in. high. French Sudan: Central Sahara: 10 miles north of Abelessa, 3,300 ft. (Mar.)! Extends from Cape Verde Islands to Sinai and Arabia. Exsicc.—Chipp 33.
15. *A. pungens* Desf. Fl. Atlant. 1: 109, t. 35; Henrard Monogr. Aristida 57, pl. ix; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 109. Suffrutescent branched perennial up to 3 ft. high. Mauritania: Bilma. Central Sahara: north of Abelessa, 3,300 ft. (Mar.)! North Africa from Algeria to Nubia and Egypt. Exsicc.—Chipp 31; 54.
16. *A. plumosa* Linn. Sp. Pl. ed. II. 1666; Henrard Monogr. Aristida 59, pl. xii; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 48. Mauritania: North of Tagant and of Adrar. Southern Sahara: near Mt. Abangarit, 1,000 ft. (Dec.)! Agades, Tintaouine, Ténéré, Borkou. Tassolé (Feb.)! From Algerian Sahara as far as Tibet. Exsicc.—Proust 5. Chev. 44195.
17. *A. acutiflora* Trin. & Rupr. in Mém. Acad. Pétersb. Ser. VI. 7: 167 (1849); Henrard Monogr. Aristida 64, pl. xiii; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 45. Mauritania: north of Tagant. French Sudan: between Oualata and Nelsa! Sahel desert! North Africa from the Western Sahara to Egypt and Nubia. Exsicc.—Herb. *Jumelle* 4. Schmitt in Herb. Chev. 28558. Charles in Herb. Chev. 28874. Leclercq 42589.
18. *A. papposa* Trin. & Rupr. l.c. 173 (1849); Henrard Monogr. Aristida 76, pl. xix. French Sudan: Sahel desert! Bamba (Sept.)! Cape Verde Islands to Nubia and Abyssinia. Exsicc.—Leclercq 42686; 42740. Hagerup 324.

Imperfectly known species.

- A. densispica* Steud. Synop. Pl. Glumac. 139 (1855). Senegal. Exsicc.—Leprieur.

54. TRAGUS Hall. Hist. Stirp. Helv. 2: 203 (1768); F.T.A. 9: 18 (in key); Fl. Cap. 7: 576.

Annual (or subperennial?); culms ascending, nodes exserted; leaf-sheaths loose, increasing in length upwards, the top one embracing the inflorescence and with a much reduced leaf-blade; ligule a delicate ciliate rim; blades linear to narrowly lanceolate from a broadish base, glaucous-green, setose-ciliate; panicle cylindric, spike-like, 6–15 cm. long; spikelets crowded; lower glume minute or suppressed, upper completely enveloping the floret, 5-ribbed, ribs covered with rows of stout curved bristles *racemosus*

- T. racemosus* All. Fl. Pedem. 2: 241; Fl. Cap. 7: 577; Chev. Bot. 721, and Rev. Bot. Appl. Agric. Trop. 1934: 110. *Cenchrus racemosus* Linn. Mauritania. French Sudan: Oualata! Sahel Desert! Timbuktu (July)! Throughout most warm regions. Exsicc.—*Jumelle*. Leclercq 42757 Hagerup 172. (See Appendix).

55. LATIPES Kunth Revis. Gram. 1: 261, t. 42 (1830).—F.T.A. 9: 18 (in key).

Perennial, wiry, creeping, with many erect or spreading branches leafy up to the racemes; leaf-sheaths tight; ligule a rim of hairs; blades linear, convolute, 3–10 cm. long, divergent, gradually subacute; racemes simple, subspiciform, up to 15 cm. long; rhachis flexuous; spikelets often purplish, 1-flowered, persistent on the hard flattened



FIG. 360.—*TRAGUS RACEMOSUS* All. (GRAMINEAE-ZOISIEAE).

A, ligule. B, pair of spikelets showing the spiny upper glumes. C, lemma. D, palea.



FIG. 361.—*PEROTIS INDICA* Beauv. (GRAMINEAE-ZOISIEAE).
A, spikelet.

truncate spreading ciliate pedicels; glumes thick and hard, lower narrow, recurved, pectinate, smooth on the back, upper nearly as long, spinulose-tuberculate

senegalensis

- L. senegalensis** Kunth l.c.—Fl. Brit. Ind. 7: 97; Chev. Bot. 722, and Rev. Bot. Appl. Agric. Trop. 1934: 111. French Sudan: Timbuktu (July)! Between Bandiagara and Douentza (July)! Goundam (Aug.)! Extends through the drier parts of N. Tropical Africa to E. Sudan and south to Tanganyika; also through Arabia to Sind (India). Exsicc.—Hagerup 206. Rugeon 449. Chev. 2331. Roger 9. Heudelot 494. (See Appendix).

56. PEROTIS Ait.—F.T.A. 9: 19 (in key); Fl. Cap. 7: 575.

Culms ascending, the uppermost nodes exserted; leaf-sheaths striate; ligule very short and thin; blades narrowly to broadly lanceolate from a broad clasping base, tapered to the acute apex, up to about 7 cm. long and 1.5 cm. broad, pectinate-ciliate, with about 6 main nerves on each side of the midrib prominent below; spike slender, 10–20 cm. long, dense, often purplish; spikelets about 2 mm. long, linear-lanceolate; glumes scaberulous, equal, passing into very fine often purplish capillary awns *indica*

- P. indica** O. Ktze Rev. Gen. Pl. 787; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 111. *P. latifolia* Ait.—Fl. Cap. 7: 575. *Anthraxanthum indicum* Linn. Up to 2 ft. high with often purple or mauve spikes. Senegal! Gambia! Gold Coast! fairly dry regions of Northern Territories (May)! Accra! Togo: near Lome! N. Nigeria: Naraguta (Aug.)! Lokoja (Sept.)! Nupe! Yola (Sept.)! S. Nigeria: Lagos! Ekoyi Plains (Mar.)! Throughout tropical Africa and Asia. Exsicc.—Brunner 650. Farnar 72. Brooks 3. Brown 385. Beal 19. Warnecke 314. Lely P. 437. Parsons 9. Barter 754. Dalz. 281. Maitland 162; 169. (See Appendix).

- 57. ORYZA** Linn.—See A. Chevalier “Documents sur le genre *Oryza*,” in Rev. Bot. Appl. Agric. Trop. 1932: 949–961, and “Nouvelle Contribution à l'étude systématique des *Oryza*,” l.c. 1014–1032.

Spikelets oblong or oblong-elliptic, 2–3 times as long as broad:

Ligules elongated, acute or at length splitting, 15–45 mm. long:

Annuals; spikelets persistent, rarely awned, setulose-pubescent; cultivated rices

1. *sativa*

Perennials with long rhizomes; spikelets deciduous, always awned, setulose mainly on the keels and ribs; wild rices 2. *Barthii*

Ligules short, truncate or obtuse, at most 6 mm. long:

Spikelets smooth or nearly so on the sides, rarely shortly awned; cultivated rices

3. *glaberrima*

Spikelets more or less scaberulous or setulose-pubescent, always long-awned; wild rices:

Rooting at the lower nodes; spikelets up to 9 mm. long; sterile lemmas 2–2.5 mm. long; awn 10–12 cm. long 4. *Stapfii*

Rooting at the base; spikelets 10–11 mm. long; sterile lemmas 3–4 mm. long; awn usually about 15 cm. long 5. *breviligulata*

Spikelets linear-oblong, 1–1.5 mm. broad, minutely pubescent towards the apex, with long very slender awns; sterile lemmas subulate-filiform.. .. . 6. *brachyantha*

1. *Oryza sativa* Linn. Sp. Pl. 333; A. Chev. l.c. 1015.

Widely cultivated.

2. *O. Barthii* A. Chev. in Bull. Mus. Par. 1910: 405. *O. perennis* subsp. *Barthii* A. Chev. Rev. Bot. Appl. Agric. Trop. 1932: 1028. *O. longistaminata* A. Chev. et Roerich.

French Sudan: Macina! Gao (Jan.)! Diré to Bandiagara (May)! Senegal: Kaolack to Niore (Oct.)! Sierra Leone: numerous localities! N. Nigeria: various localities! Also in the Gabon and Congo. Exsicc.—Chev. 24924; 33841; 33934; 43058. Rugeon 253. Deighton 1416; 1543; 1544; 1764. Sampson 15; 24; 47a; 48; 52. Scotland. Palmer 18. Lamb 100. Moiser 147. Dalz. 909.

3. *O. glaberrima* Steud. Synop. Pl. Gram. 3; A. Chev. l.c. partly (excl. 2^e série *O. Stapfii* Roschev.).

French Sudan: Kati garden (Oct.)! Koulikoro! Senegal: Casamance (Jan.)! Gambia! French Guinea: Farana! Sierra Leone: various localities! Liberia: Moala (Nov.)! Gold Coast: Tamile (Nov.)! N. Nigeria: Cult. at Samaru from S. Sokoto! Sokoto! Exsicc.—Chev. 2054; 2205; 25004. Pirie 40; 44; 53; 57. Thomas 723; 1038; 1897; 3386. Deighton 1543; 1798; 2821; 2823; 2825.

Linder 1373. Sampson 3; 7; 14; 16; 51. Moiser 130; 131.

Chevalier (l.c.) distinguishes two varieties, var. *mutica* A. Chev. and var. *subaristata* Roschev., the latter with shortly awned spikelets.

4. *O. Stapfii* Roschev. in Bull. Appl. Bot. Leningrad 1931, 27: No. 4, 51. *O. glaberrima* 2^e série *Stapfii* A. Chev. l.c. 1026.

French Sudan: Tanfola (Mar.)! Mafadie (Oct.)! Between Faguiabine and Bomma (Aug.)! Gambia:

Georgetown and District (Sept.)! Sierra Leone: Njala (Dec.)! Exsicc.—Chev. 642; 2206; 2207; 2208. Pirie 46. Deighton 2824.

5. *O. breviligulata* Chev. et Roerich. ex A. Chev. l.c. 1018.

French Sudan: Segou (Sept.)! Niamey-Zinder, common! N. Nigeria: Katagum, abundant! Also in the Ubangui-Shari region. Exsicc.—Chev. 24981. Hagerup 569. Dalz. 268.

6. *O. brachyantha* A. Chev. & Roerich ex A. Chev. l.c. 1022, incl. var. *guineensis* A. Chev. *O. guineensis* A. Chev. name only.

French Sudan: Ségon (Sept.)! French Guinea: Baffing and Tinkisso valleys (Nov.)! Between Dubréka and Conakry (Nov.)! Sierra Leone: Lungi (Nov.)! Also in Ubangui. Exsicc.—Chev. 24977; 34616 bis. Pöbégün 1818. Glanville 102.

58. LEERSIA Swartz—F.T.A. 9: 22 (in key); Fl. Cap. 7: 659.

Lemma smooth on the sides or very nearly so, cartilaginous, very obscurely ciliate on the keel; leaf-sheaths markedly ciliate upwards; blades acute, shortly ciliate

- towards the apex, 5-7 cm. long, 3-4 mm. broad; panicle shortly exserted, about 5 cm. long; branches ascending, almost capillary, up to 2.5 cm. long, the flowering portion very flexuous; pedicels 0.75 mm. long; spikelets pale, broadly and obliquely elliptic, 2 mm. long, subacutely apiculate. 1. *triandra*
- Lemma more or less pubescent on the sides, thinner, prominently ciliate on the keel: Hairs on the lemma curved almost to a semicircle; leaf-sheaths very long, ribbed; ligule 3 mm. long; blades narrowly linear, tapered to the apex, up to 15 cm. long, scabrid below; panicle narrow, slender, 10-15 cm. long; branches capillary, ascending, the flowering part very flexuous; spikelets pale or purplish, elliptic, 2 mm. long, minutely apiculate; glumes very minute 2. *drepanothrix*
- Hairs on the lemma rather long and straight or nearly so, keel markedly ciliate; leaf-sheath with a tuft of short hairs around the base, ribbed; ligule short; blades broadly linear, very acute, up to about 20 cm. long and 1.3 cm. broad, retrorsely hispidulous on the midrib below; panicle as above 3. *hexandra*
1. *L. triandra* C. E. Hubbard in Kew Bull. 1936: ined. Straggling up to 1 ft. high; rare.
Sierra Leone: marsh near Konta, between Kasokora and Bumban (Aug.)! Exsicc.—Deighton 1241.
2. *L. drepanothrix* Stapf in Journ. de Bot. 19: 107 (1905); Chev. Rev. Bot. Appl. Agric. Trop. 1934: 134. Slender, 1-1½ ft. high.
French Guinea: Kouroussa! Baffing valley, in cultivated ground (Nov.)! Exsicc.—Pobéquin 495; 1849.
3. *L. hexandra* Swartz Prod. Veg. Ind. Occ. 21; Fl. Cap. 7: 659; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 134. "*L. angustifolia* Munro et Schum." ex Chev. Bot. 739? Up to about 4 ft., semi-erect from a creeping stoloniferous rhizome.
French Guinea: Timbo (Oct.)! Sierra Leone: Yonibama, damp situation (Jan.)! Gold Coast: water-side grass (loc. ?)! N. Nigeria: Naraguta! Abinsi, in rice fields (Oct.)! Nupe, in swamps! S. Nigeria: Lagos, in swamps on Ikoyi Plains (Sept.)! Obu! Widely spread through tropical and subtropical regions. Exsicc.—Pobéquin 1714. *Glanville* 154. *Beal* 27. *Lely* P. 408. *Dalz.* 884; 1812. *Rarter* 783. *Dawodu* 21. *Thomas* 430. (See Appendix).

59. LEPTASPIS R.Br.—F.T.A. 9: 25 (in key).

- Perennial; culms ascending, rooting at the lower nodes; leaf-sheaths open in the upper part, closely nerved; ligule a short ciliate rim; blade oblong or broadly oblong-oblancoelate, very acute at the apex, subacute at the base, 10-20 cm. long, 3-5 cm. broad, thin, subpinnately nerved with about 4 pairs of principal lateral nerves with about 8-10 fainter nerves between and distinct transverse nerves; "petiole" pubescent, about 1 cm. long; panicle terminal, slender; branches mostly 2-3 in a whorl, shortly pubescent; grain free within the inflated accrescent oblique pubescent ribbed utricle resembling a Boraginaceous nutlet *cochleata*
- L. cochleata* Theaetis Enum. Pl. Zeyl. 357; Fl. Brit. Ind. 7: 95. *L. cochifera* Hack.; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 135. *Lepidaspis cochifera* A. Chev. Bot. 753 (error).
Occurs as forest undergrowth from French Guinea to Cameroons Mt. (3,500 ft.) and Fernando Po; also St. Thomas, tropical Africa generally and in Madagascar and Ceylon.

60. OLYRA Linn.—F.T.A. 9: 25 (in key).

- Perennial, erect; nodes enclosed or exserted; sheaths closely nerved, ciliate upwards; blades shortly "petiolate," ovate-elliptic or ovate-oblong, tailed-acuminate, rounded at the base, 10-20 cm. long, 3.5-5.5 cm. broad, glabrous or slightly pubescent below, with about 8 primary nerves on each side of the midrib and fainter ones between and with fairly distinct transverse nerves; "petiole" pubescent; panicle narrow to subpyramidal; axis and branches shortly pubescent; male pedicels slender, female clavate; male spikelets lateral, awned from the valve; glumes rudimentary; female spikelets terminal on the branchlets, ovoid, long-awned from the lower 7-9-nerved glume; grain tightly enclosed by the hardened shining lemma, whitish and shining *latifolia*
- O. latifolia* Linn. Amoen. Acad. 5: 408; Fl. Cap. 7: 746; Chev. Bot. 737, and Rev. Bot. Appl. Agric. Trop. 1934: 135. *O. brevifolia* Schum.; Chev. Bot. 737. Tall cane-like grass up to 10 ft. in or near forests; lateral shoots occasionally occur with much small leaves.
In forest areas throughout the region and in tropical Africa generally, and in Zululand; also in the Mascarenes and tropical America. (See Appendix).

61. LOUDETIA* Hochst. ex Steud. Syn. Pl. Glum. 1: 238 (1854). (See Appendix).

- *Lower floret ♂, with a well-developed valvule; anther-tips glabrous; awn up to 10 mm. long;
Valve of the lower floret 3-nerved (rarely 7-nerved); anthers 2-3;
Spikelets paired or solitary;
Valve of the upper floret loosely pilose with long hairs; callus truncate; awn 1.3-2 cm. long; reed-like perennials; culms stout, erect, up to 5 m. or more high; leaf-blades up to 1 m. long and 2 cm. broad; panicle 0.3-0.6 m. long, contracted and dense 1. *phragmitoides*
Valve of the upper floret pubescent to glabrescent; callus pungent, 2-toothed, emarginate or truncate, about 2 mm. long; awn usually over 2.5 cm. long; perennials or annuals;

* See note, p 496.



FIG. 362.—*LEERSIA HEXANDRA* Swartz. (GRAMINEAE-ORYZEAE).

A, ligule. B, spikelet showing lemma (left) and palea (right). C, side view of same. D, palea showing stamens. E, stamens and pistil.

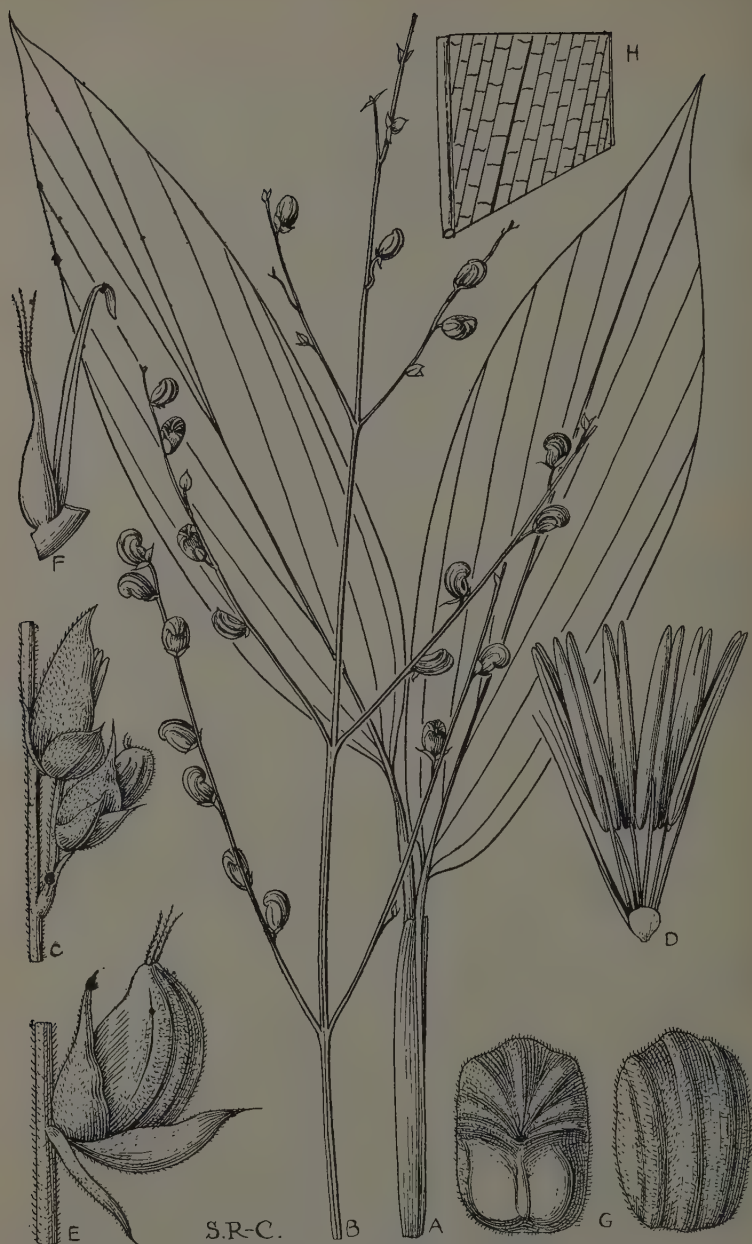


FIG. 363.—*LEPTASPIS COCHLEATA* Thwaites (GRAMINEAE-PHAREAE).

A, leafy shoot. B, inflorescence. C, pair of spikelets. D, male flower. E, female spikelet. F, pistil. G, lemmas. H, part of leaf showing venation.



FIG. 364.—*OLYRA LATIFOLIA* Linn. (GRAMINEAE-OLYREAE).

A, flowering shoot. B, male and female spikelets. C, lemma of male spikelet. D, palea. E, male flower. F, lower glume of female spikelet. G and H, female floret. I, female flower.

Perennials, usually densely tufted; valve of the lower floret from $\frac{3}{4}$ to as long as the spikelet; awn up to 5.5 mm. long:

Panicle loose or contracted, but not spike-like, up to 60 cm. long and 15 cm. broad; branches over 1 cm. long:

Anthers 2; valve of the upper floret 5-7-nerved; upper glume and valve of the lower floret truncate, obtuse or subacute at the tip:

Callus truncate or slightly emarginate; spikelets mostly about 10 mm. long; panicle at length open and loose, branches up to 25 cm. long; leaf blades up to 0.75 m. long and 1-6 cm. broad, tapered to a fine point, glabrous or loosely pilose to hispid. 2. *arundinacea*

Callus emarginate and 2-toothed:

Valve of the upper floret acutely 2-lobed with the lobes 0.5-1 mm. long; lower glume usually less than half as long as the spikelet; spikelets mostly 1-1.4 cm. long, glabrous, rarely bristly; nodes not blackened:

Leaf-blades rather broad and short, acute, up to 20 cm. long and 5.5 mm. broad, flat; lower sheaths persistent, glabrous or sparingly hairy at the base; nodes usually glabrous. 3. *camerunensis*

Leaf-blades narrowly linear, tapered to a fine point, up to 30 cm. long and 6 mm. broad, convolute or flat; lower sheaths often breaking into fibres and villous or woolly at the base; nodes often bearded

4. *simplex*

Valve of the upper floret very minutely and obtusely 2-lobed, lower glume about half as long as the spikelet; spikelets lanceolate, mostly about 10 mm. long, bristly; nodes usually blackened; leaf-blades linear, finely pointed, loosely to sparingly clothed with tubercle-based hairs or glabrescent; panicle up to 20 cm. long, with darkened nodes. 5. *kagerensis*

Anthers 3; valve of the upper floret usually 9-nerved; upper glume and lower valve finely or setaceous acute; leaf-blade narrowly linear, tapering to a flexuous setaceous tip, glabrous to shortly and stiffly pilose from minute tubercles; panicle erect, about 25 cm. long; spikelets mostly paired, gaping, yellowish brown; awns slender, 2.5-4 cm. long. 6. *acuminata*

Panicle very dense and spike-like, up to 15 cm. long, 6-14 mm. broad; branches very short, up to 6 mm. long, 1-4-spiculate; lower leaf-sheaths densely pilose at the base; ligule a densely ciliolate rim; leaf-blades narrowly linear, setaceous, convolute. 7. *coarctata*

Annals; valve of the lower floret $\frac{1}{2}$ - $\frac{3}{4}$ as long as the spikelet; awn 5-12 cm. long:

Panicle elliptic to oblong, about 10-15 cm. long; callus of the upper floret emarginate and 2-toothed; upper valve 4 mm. long; glumes 3-nerved, loosely setose and minutely hairy. 8. *annua*

Panicle linear, contracted, dense, up to 45 cm. long; callus of the upper floret sharply acute or rarely oblique 2-toothed; upper valve 3-4 mm. long; glumes loosely setose and minutely pubescent. 9. *hordeiformis*

Spikelets in threes at the tips of the branches and branchlets, shortly pedicelled; callus emarginate, 2-toothed or truncate:

Lower glume $\frac{1}{2}$ - $\frac{3}{4}$ as long as the upper; valve of the lower floret 3-nerved:

Glumes setose or pilose with tubercle-based hairs; pedicels with similar hairs towards their tips or glabrous:

Panicle up to 35 cm. long, stiff, contracted and rather dense; rhachis glabrous or sparingly hairy; culms stout, up to nearly 2 m. high:

Spikelets 7-9 mm. long; pedicels glabrous; panicle 30-38 cm. long, very narrow; lower glume rounded-obtuse at the apex. 10. *ternata*

Spikelets 6-8 mm. long; pedicels usually bearing a few stiff white or yellowish hairs; panicle 20-27 cm. long, oblong; lower glume obtuse to subacute

11. *ambiens*

Panicle 7-15 cm. long, flexuous, loose; rhachis and branches pilose to villous; culms slender, up to nearly 1 m. high; leaf-blades subsetaceous, finely pointed, up to 20 cm. long, involute; spikelets 6-7 mm. long; glumes with fine white spreading hairs. 12. *capillipes*

Glumes and pedicels glabrous, or the lower glume with a few hairs towards the apex; panicle 18-36 cm. long, narrow; spikelets 7-8 mm. long; glumes 3-nerved; leaf-blades tapered to a fine point, 5 mm. broad, glabrous or nearly so. 13. *glabrata*

Lower glume very slightly shorter than the upper; valve of the lower floret 7-nerved; panicle 8-10 cm. long, loose; spikelets lanceolate, 6 mm. long; culms wiry; leaf-blades linear, tapered to a fine point, shortly pilose or glabrous

14. *trigemina*

**Lower floret barren and reduced to the valve; anthers 2, their tips minutely hairy; spikelets 2-2.6 cm. long; awns up to 17 cm. long, scabrid; panicles contracted; branches 2-4-nate or the upper solitary; leaf-blades linear, tapered to a finely



FIG. 365.—*LOUDETIA ACUMINATA* C. E. Hubbard (GRAMINEAE-ARUNDINELLEAE).
 A, plant. B, spikelet. C, lower glume. D, upper glume. E, lower lemma. F, lower
 palea. G, upper floret. H, upper lemma. I, upper palea.

acute rigid tip, the lower hairy on the lower surface with stiff tubercle-based hairs. 15. *togoensis*

1. *L. phragmitoides* C. E. Hubbard in Kew Bull. 1934: 428. *Trichopteryx flammida* Dur. & Schinz, partly. *T. phragmitoides* A. Peter, not Benth. *Arundinella flammida* A. Chev. in Rev. Bot. Appl. Agric. Trop. 1934: 41, not of Trin. A reed-like perennial up to 15 ft. or so.
French Guinea: Baffing Valley (Oct.)! French Sudan: south of Sankoroni to Bammako! Sierra Leone: Benekoro, and at Serikudi! Liberia: Grand Bassa! N. Nigeria: swamp near Jeba, Nupe! S. Nigeria: Lagos! Agolo! Tropical Africa generally. Exsicc.—*Pobéguin* 1801. *Chev.* 225; 34296. *Glanville* 321. *Barter* 1028. *Thomas* 293. *MacGregor* 102; 331. *Dalz.* 1318. *Maitland* 171. (See Appendix).
2. *L. arundinacea* Steud. Syn. Pl. Glum. 1: 238 (1854). *Tristachya arundinacea* Hochst. ex A. Rich. *Trichopteryx arundinacea* Hack. ex Engl. *T. nigritiana* Stapf, partly. *T. simplex* Rendle, not of Hack. A tufted perennial up to 10 ft. high.
French Guinea: Timbo! Futa Jallon; between Dalaba and Songueta! Sierra Leone: various localities! Southern Nigeria: various localities! N. Nigeria: Jeba! Bauchi Plateau! Tropical Africa generally. Exsicc.—*Pobéguin* 1724; 1725; 1726; 1729. *Chev.* 20171. *Deighton* 814; 920. *Glanville* 64. *Thomas* 188; 1840; 1931; 2735; 3801. *Dawodu* 240. *Talb.* 843. *Migeod* 347. *Barter*. *Lely* 498.
Var. *trichantha* C. E. Hubbard. Glumes sparsely to densely setulose or pilose with white hairs from dark-brown or blackish tubercles.
Sierra Leone: Kanya, 1,500 ft. ! Kaballa, 1,200 ft. ! Also in French Cameroons and other parts of tropical Africa. Exsicc.—*Thomas* 3043; 2266.
3. *L. camerunensis* C. E. Hubbard in Kew Bull. 1934: 431. *Trichopteryx camerunensis* Stapf. *Loudetia elegans* Hook. f., not of Hochst. A loosely tufted perennial up to 3 ft. high.
Cameroons Mt.: 5,000–8,000 ft. (Nov.–Feb.)! Exsicc.—*Mann* 1346; 2080. *Dunlap* 216. *Dalz.* 8355. *Migeod* 217. *Maitland* 346; 865; 1036.
4. *L. simplex* C. E. Hubbard in Kew Bull. 1934: 431. *Trichopteryx simplex* Hack. ex Engl. *T. nigritiana* Stapf, partly. *Tristachya simplex* Nees. *T. elegans* A. Rich. *Loudetia elegans* Hochst. ex A. Br. A tufted perennial 1–5 ft. high.
French Guinea: Kouroussa (Aug.)! Timbo (Oct.)! N. Nigeria: Naraguta (Aug.)! Jeba! Abinsi, abundant in the bush (Oct.)! Vodni! Bauchi Plateau! Tropical Africa generally. Exsicc.—*Pobéguin* 504; 1725; 1726. *Barter*. *Lely* 444; 500; 781. *Macleod* 33. *Dalz.* 867. *Saunders* 63.
5. *L. kagerensis* C. E. Hubbard MS. *Trichopteryx kagerensis* K. Schum. *Tristachya kagerensis* A. Chev. in Rev. Bot. Appl. Agric. Trop. 1934: 23. Perennial up to 3½ ft. high, slender and wiry, darkened around the nodes.
French Guinea: Timbo (Oct.)! Sierra Leone: Brookfields (Oct.)! Tropical Africa generally. Exsicc.—*Pobéguin* 1728. *Deighton* 2168.
6. *L. acuminata* C. E. Hubbard in Kew Bull. 1934: 429. *Trichopteryx acuminata* Stapf. *T. nigritiana* Stapf, partly. A densely tufted perennial 4–5 ft. high.
N. Nigeria: Nupe, open plains! Lokoja (Oct.)! Also in French Cameroons. Exsicc.—*Barter* 953. *Dalz.* 291.
7. *L. coarctata* C. E. Hubbard in Kew Bull. 1934: 428. *Tristachya coarctata* A. Camus. *T. triticoides* A. Camus & C. E. Hubbard ex A. Chev. Rev. Bot. Appl. 1934: 43.
French Guinea: Dalaba, 4,000 ft. ! Between Timbo and Ditian (Sept.)! Exsicc.—*Chev.* 18445; 34989.
8. *L. annua* C. E. Hubbard in Kew Bull. 1934: 429. *Trichopteryx annua* Stapf. *T. Thorbeckii* Pilger. Culms erect, up to 3½ ft. high, with torch-like panicles and very long awns.
N. Nigeria: Zaria distr.! Bauchi Plateau (Aug., Oct.)! Vodni, Pankshin Div.! Also in French Cameroons and E. Sudan. Exsicc.—*Taylor* 30. *Lely* P. 650; P. 808; 761. *Saunders* 51.
9. *L. hordeiformis* C. E. Hubbard in Kew Bull. 1934: 431. *Trichopteryx hordeiformis* Stapf. A barley-like grass up to 5 ft. high, with dense narrow panicles of long-awned spikelets.
Gambia: Yoroberi Kunda (Sept.)! French Sudan: Koulikoro (Oct.)! Between Sansanding and Segou (Oct.)! Niamey! Ivory Coast: near Dotou, 600–700 ft. ! North Baoulé (July)! Gold Coast: Tamale (Nov.)! N. Nigeria: various localities! Also in the Shari Region. Exsicc.—*Chev.* 2372 bis (partly); 2375; 21759; 22149; 22363. *Hagerup* 502a. *Williams* 856. *Beal* 36. *Barter* 954. *Baikie*. *Dalz.* 276; 504; 883. *Moiser* 137. (See Appendix).
10. *L. ternata* C. E. Hubbard in Kew Bull. 1934: 431. *Trichopteryx ternata* Stapf. Erect perennial up to 5½ ft. high; awns slender.
French Guinea: Kouroussa (Sept.)! Dahomey: between Sokode and Basari, Koukomba, 660 ft. ! Exsicc.—*Pobéguin* 510. *Kersting* 575.
11. *L. ambiens* C. E. Hubbard in Kew Bull. 1934: 431. *Trichopteryx ambiens* K. Schum. Densely tufted perennial up to 3½ ft. high; awns slender.
N. Nigeria: Abinsi near pools (Oct.)! Ivory Coast: North Baoulé (Aug.)! Dahomey: Misahöhe! Also in Portuguese Congo. Exsicc.—*Chev.* 22332. *Baumann* 353. *Mildbr.* 7271. *Dalz.* 855.
12. *L. capillipes* C. E. Hubbard in Kew Bull. 1934: 432. A slender tufted perennial up to 2½ ft. high; awns spirally twisted.
French Guinea: Timbo, marshy rocky plateaux! Exsicc.—*Pobéguin* 1757.
13. *L. glabrata* C. E. Hubbard in Kew Bull. 1934: 431. *Trichopteryx glabrata* K. Schum. A densely tufted perennial up to 4½ ft. high.
Gold Coast: Aketebua (Jan.)! Also in French Cameroons. Exsicc.—*Thomas* D51.
14. *L. trigemina* C. E. Hubbard in Kew Bull. 1934: 432. Perennial with thickened rootstock; panicle with few awns.
N. Nigeria: Wana, in crevices on granite rocks! Exsicc.—*Hepburn*.
15. *L. togoensis* C. E. Hubbard in Kew Bull. 1934: 431. *Trichopteryx togoensis* Pilger. *T. crinita* Stapf. Annual up to 3½ ft. high; awns very long and whip-like.
French Guinea: Kouroussa (Aug.)! French Sudan: San! Koulikoro! Nérécoro! Ouagadougou! Macina (Mar.)! Niamey (Oct.)! Also in N. Central Africa. Exsicc.—*Pobéguin* 492; 505. *Chev.* 2324; 2325; 2372; 2373; 2375; 24739; 24763; 24764; 24881; 24889. *Hagerup* 495. *Kersting* 662. (See Appendix).

62. TRICHOPTERYX * Nees in Lindl. Nat. Syst. ed. 2: 449 (1836);

F.T.A. 9: 17 (in key).

Inflorescence more or less embraced at the base by the uppermost leaf-sheath; whole plant silky-pilose; leaf-blades lanceolate to ovate-lanceolate, rounded at the base, 1–2 cm. long, 5–8 mm. broad, margins cartilaginous; panicle 2–3.5 cm. long, dense, with capillary branches and pedicels; spikelets lanceolate, at length gaping, 3–4 mm. long, yellowish brown; glumes membranous, with a few stiff white hairs, lower narrowly ovate, 2–2.5 mm., upper as long as the spikelet; lemma of upper floret 2-lobed, each lobe passing into a capillary bristle up to 5 mm. long . . . 1. *Glanvillei*

* See note, p. 496.

Inflorescence long-exserted on a slender peduncle from the uppermost leaf-sheath; whole plant shortly and softly pubescent; leaf-blades lanceolate, rounded at the base, up to 1.4 cm. long, 2–4 mm. broad; panicle loose, with sometimes a few spikelets from the base in the axil of the leaf-blade, with capillary branches and pedicels; spikelets similar to above 2. *elegantula*

1. *T. Glanvillei* C. E. Hubbard in Kew Bull. 1934: 426. Small annual up to 4 in. high, 4–8-noded. Sierra Leone: Bintumane, 6,300 ft. (Nov.)! Exsicc.—*Glanville* 335.
2. *T. elegantula* Stapf in Hook. Ic. Pl. 24: t. 2394 (1895). *Arundinella elegantula* Hook. f. Annual up to 6 in. high, up to 6-noded. Cameroons Mt.: 6,000–8,500 ft., in grassland (Nov.–Dec.)! Exsicc.—Mann 2092. *Migeod* 204.

63. **DANTHONIOPSIS** * Stapf in Hook. Ic. Pl. 31: t. 3075 (1916).

A tufted perennial 2–3 m. high; culms erect, simple, 3–4-noded; leaf-sheaths much shorter than the internodes, the lowest densely and shortly silky-villous at the base; ligule a densely ciliate rim; blades broadly linear, narrowed to the base, tapered to a fine point, up to 60 cm. long and 2 cm. broad, spinulously scabrid on the cartilaginous margins; panicle narrowly ovate in outline, about 20 cm. long, loose; spikelets ovate-lanceolate, 8–10 mm. long, variegated with purple or brown; glumes conspicuously 3-nerved, the lower ovate, shortly acuminate, 5–6 mm., upper oblong elliptic, as long as the spikelet; awn of upper floret 14–16 mm. long, disarticulating from the lemma *Chevalieri*

- D. *Chevalieri* A. Camus & C. E. Hubbard in Rev. Bot. Appl. Agric. Trop. 1934: 780. French Guinea: Timbo (Oct.)! Between Lobé and Moli, 4,300 ft. (Nov.)! Sierra Leone: Serikudi (Kamuke), in open orchard bush, common at 1,200–1,500 ft. Exsicc.—*Pobéguin* 1727. *Chev.* 34603 *Glanville* 313.

64. **TRISTACHYA** * Nees Agrost. Bras. 458 (1829); F.T.A. 9: 17 (in key); Fl. Cap. 7: 452.

Pedicels distinct; lemma of lower floret 3-nerved; ovary glabrous:

Lemma of the upper floret without a transverse row or tuft of hairs below each lobe; lobes awnless; callus obliquely truncate or emarginate or sharply 2-toothed; anthers 2:

Perennials; branches recurved below each triad: spikelets golden-brown; awn up to 7 cm. long; callus obliquely truncate or emarginate:

Spikelets 1.5–2 cm. long; awns 5–7 cm. long; leaf-sheaths ciliate; nodes long-pilose; ligule a densely ciliate rim; blades narrowly linear, up to 30 cm. long and 4 mm. broad, glabrous to densely hispid; panicle raceme-like, secund; branches very slender, pilose upwards, usually bearing a single triad

1. *chrysothrix*
Spikelets 1–1.6 cm. long; awns 4–5 cm. long; leaf-sheaths tight, hispid-pilose or only ciliate along the margins; nodes densely bearded with long hairs; ligule a densely ciliate rim; blades narrowly linear, setaceous acute, up to 45 cm. long, convolute, pilose below; panicle loose, slender, with slender branches bearing 1–3 triads 2. *fulva*

Annual; branches straight below each triad; spikelets pale yellow or pallid; awn up to 11 cm. long; callus sharply 2-toothed; leaf-sheaths very tight, shorter than the internodes; upper nodes long-pilose with yellowish hairs; blade very narrowly linear, tapering to a fine tip, up to 20 cm. long, glabrous or nearly so; panicle bearing few triads of spikelets, laxly covered with tubercle-based bristles

3. *Kerstingii*

Lemma of the upper floret with a transverse row or tuft of hairs below each lobe; lobes awned; callus obtuse or truncate; anthers 3:

Leaf-blades linear to narrowly lanceolate, up to 9 mm. broad; triads up to 34 to each panicle; lower glume 3.5–6 mm. long; spikelets straw-coloured or purple:

Lower glume glabrous or nearly so; spikelets 6–6.5 mm. long, pale, with long awns spirally twisted in the lower half; leaf-blades lanceolate, contracted at the base, tapered to the apex, 6–10 cm. long, about 9 mm. broad, glabrous except for a few weak hairs on the margin near the base; nodes up to 10, glabrous; panicle contracted, about 10 cm. long, the branches with long white hairs towards the apex 4. *multinodis*

Lower glume setose with spreading tubercle-based hairs; spikelets 6.5–8 mm. long, straw-coloured or purplish, with slightly spirally twisted awns; leaf-blades as above, glabrous or thinly pilose on the upper surface; nodes up to 8; panicle as above, branches bearing 2–4 triads, and with long white bristle-like hairs upwards 5. *tristachyoides*

Leaf-blades narrowly linear, up to 3 mm. broad; triads up to 12 to each panicle; branches comparatively short and mostly unbranched; lower glume 7–8 mm. long; spikelets dark purple, 7–10 mm. long, beset with long bristle-like tubercle-based hairs 6. *purpurea*

* See note p. 496.

Pedicels connate or nearly so; valve of the lower floret mostly 7-nerved; ovary hairy at the top; leaf-sheaths much shorter than the internodes, more or less thinly pilose with tubercle-based hairs; blades linear, long, glabrous or pilose; raceme rigid, narrow, spike-like, with few erect very short branches each bearing usually a solitary triad; spikelets with rather short tubercle-based hairs 7. *Thollonii*

1. *Tristachya chrysothrix* Nees Agrost. Bras. 460 (1829). Erect, up to 4 ft., with panicles of nodding triads of spikelets covered with long brown hairs and with very long coarse awns. N. Nigeria: Bauchi Plateau, on plains (Aug.)! Also in Brazil and Paraguay. Exsicc.—*Lely* P. 493.
2. *T. fulva* C. E. Hubbard in Kew Bull. 1934: 434. Up to 4 ft., slender, like the last but with smaller triads and more slender awns. French Guinea: Timbo, on dry ground (Sept.)! Exsicc.—*Pobéguin* 1758.
3. *T. Kerstingii* C. E. Hubbard l.c. 435. Up to 3 ft.; panicles small, with few erect triads covered with long yellowish hairs. Dahomey: Sokode-Bassari, Koukomba. N. Nigeria: Nupe, open plains! Lokoja. Exsicc.—*Kersting* 621. *Barter* 1385. *Macleod* 36.
4. *T. multinodis* C. E. Hubbard l.c. 1935: 308. Spikelets without the long hairs of the preceding species, in rather close panicles. Sierra Leone! Exsicc.—*Lane-Poole* 418.
5. *T. tristachyoides* C. E. Hubbard l.c. 1935: 309. *Panicum tristachyoides* Trin. *T. microstachya* Nees ex Steud. *T. tuberculata* Stapf. A tufted perennial up to 4 ft.; nodes long-exserted from the sheaths. Senegal! Sierra Leone: various locs. (Oct.-Jan.)! Exsicc.—*Thomas* 3117; 3927. *Lane-Poole* 406. *Sc. Elliot* 4536. *Deighton* 82. *Deighton* 1281; 2176.
6. *T. purpurea* C. E. Hubbard l.c. 1935: 308. Perennial, up to nearly 2 ft. high; spikelets purple, in small panicles and beset with stiff whitish hairs; triads of spikelets appressed to the rachis and beset with short bristle-like hairs. French Guinea: Timbo, very common in wet places on rocky plateau (Sept.)! Exsicc.—*Pobéguin* 1756; 1757.
7. *T. Thollonii* Franch. in Bull. Soc. Hist. Nat. Autun. 8: 374 (1895). Densely tufted perennial up to 4 ft. high. N. Nigeria: Abinsi rice fields, tall grass in sparse clumps (Dec.)! Also in French Cameroons, French and Belgian Congos, Tanganyika and N. Rhodesia. Exsicc.—*Dalziel* 882; 886.

65. ARUNDINELLA * Raddi Agrost. Bras. 37, t. 1, fig. 3 (1823).

Perennial up to 3-25 m. high; culms erect, 3-6-noded, glabrous; nodes shortly bearded; ligule very short, ciliate; blades linear, tapered to a fine point, up to 30 cm. long, 3-9 mm. broad, glabrous or hirsute from minute tubercles, margins scabrid; panicle oblong, dense, up to 35 cm.; spikelets subsecund, ovate to oblong, 4-6 mm. long; glumes glabrous, lower broadly lanceolate to ovate, acute or mucronate, 3-5 mm. long, 3-5-nerved, upper narrowly ovate, 5-nerved; lemma of upper floret with a geniculate awn 4-6 mm. long *Äcklonii* var. *major*

- A. *Ecklonii* Nees, var. *major* C. E. Hubbard in Kew Bull. 1934: 425.
French Guinea: Futa-Jallon; Mali. Between Lobé and Mali (Nov.)! Exsicc.—*Chev.* 34593; 34601 b's.
The species occurs in East Tropical Africa, Rhodesia and in South Africa.

66. ISACHNE R.Br.—F.T.A. 9: 1090.

Lemmas similar in shape and texture and more or less in size; florets almost contiguous; leaf-blades linear-lanceolate, slightly contracted at the base, tapered to a hard acute tip, usually about 8-10 cm. long and 1-1.3 cm. broad, 1 minutely pubescent below; lateral nerves 4-5 on each side of the midrib; panicle open, with very slender branches up to 10 cm. long; spikelets subglobose 1.25 mm. long, pale green; glumes pubescent towards the apex 1. *Buettneri*

Lemmas dissimilar, the lower larger, thinner, glabrous or nearly so, the upper smaller, minutely hairy; florets separated by a minute rachilla-joint:

Leaf-blades linear-lanceolate, slightly rounded at the base, gradually acute, 6-12 cm. long, up to 1 cm. broad, hispidulous or glabrescent below; ligule fringed with short hairs; panicle about 8 cm. long; spikelets about 2.5 mm. long, pale below with purple tips; glumes subequal, 5-7-nerved; upper lemma loosely pubescent

2. *guineensis*

Leaf-blades lanceolate, rounded at the base, gradually acute, 3-6 cm. long, usually nearly 1 cm. broad, scaberulous on the close nerves above, softly puberulous below; ligule fringed with long stiffish hairs; panicle up to 8 cm. long, fairly loose; spikelets broadly elliptic to obovate, obtuse, about 2 mm. long, green or purplish, lower glume obovate, 5-7-nerved; upper lemma densely pubescent . . . 3. *kiyalaensis*

1. *Isachne Buettneri* Hack.—F.T.A. 9: 1091; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 40. Ascending or half-climbing in shady bush-paths or even in fresh running water with loose panicles of very small spikelets on capillary pedicels.

Sierra Leone: Kuntala (June)! Mayoso (Aug.)! Heddlé's Farm (May)! Potoru (Apr.)! Zimi (Jan.)! Liberia: Cape Palmas! Rippue's Town! Ivory Coast: Cavalry R. Basin! N. Nigeria: Nupe! S. Nigeria: near Soo (July)! Oban! Also in Uganda, French Cameroons to the Belgian Congo and in St. Thomas Island. Exsicc.—*Sc. Elliot* 3924. *Thomas* 411; 1429. *Deighton* 1194; 1661. *Fisher* 6 (partly). *Vogel*. *Linder* 370. *Chev.* 19547. *Barter* 1362. *Jeffreys* 27. *Talbot* 769.

2. *I. guineensis* Stapf & C. E. Hubbard.—F.T.A. 9: 1094; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 41.

French Guinea: between Mali and Mt. Loura, 4,830 ft. in stream. Exsicc.—*Chev.* 37601.

3. *I. kiyalaensis* Robyns.—F.T.A. 9: 1096. *I. Cailliet* A. Chev. Ascending or scrambling; leaves sometimes dark purple.

Sierra Leone: Port Lokoh (Dec.)! Kennema (Jan.)! Newton (Nov.)! Regent (Oct.)! Marsh near Giema (Apr.)! Yetaya (Sept.)! Liberia: Dukwai R., Monrovia, in creek bed (Oct.-Nov.)! S. Nigeria:

Aguku! Extends to Portuguese Congo. Exsicc.—Thomas 631; 2446; 6521; 7542. Deighton 1454; 1640; 2183. Cooper 26. Caille 18139.

Excluded Species

I. Trochaintii A. Camus = *Panicum Trochaintii* A. Camus.

67. HETERANTHOCIA Stapf in Hook. Ic. Pl. 30 : t. 2927.—F.T.A. 9 : 1098.

Annual; culms rooting at the lower nodes; leaf-sheaths very tight, 1-2.5 cm. long, sulcate, long-ciliate towards the apex; ligule a line of long fine hairs; blades lanceolate, short, 1.5-3 cm. long, 3-5 mm. broad, finely appressed-pubescent below, very closely nerved and minutely scabrid above; panicle raceme-like, with short spreading or slightly deflexed branches; rhachis tapered to a subacute hard naked tip, flattened and ciliate on the margins with rigid tubercle-based hairs; spikelets about 2 mm. long, secund on the abaxial side of the rhachis; glumes similar, subequal, 4-7-nerved *guineensis*

H. guineensis Robyns—F.T.A. 9 : 1099. *H. isachnoides* Stapf in Hook. Ic. Pl. 30 : t. 2927; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 41. *Dinebra guineensis* Franch. A very distinct swamp grass with flattened ciliate rhachis and secund spikes.

Sierra Leone: Rowala (July)! Makump, in shallow water (July)! N. Nigeria: Nupe, in swamps! Extends through the Shari country to Uganda and Tanganyika (Bukoba) and through French Cameroons to the Belgian Congo. Exsicc.—Thomas 1091. Glanville 237. Barter 1348.

68. PANICUM Linn.—F.T.A. 9 : 638. (See Appendix).

KEY TO SECTIONS.

*Spikelets symmetrical in profile; leaves never ovate or ovate-lanceolate:

Lemma of lower floret more than 3-nerved:

†Leaf-blades usually more than 1.5 cm. long, or, if not, then subulate-involute and pungent:

Spikelets over 2.5 mm. long, or if smaller then different from those of § *Monticolae* (see below) and on plants of different habit:

Fertile lemma very minutely mucronate, like the palea finely transversely rugose; spikelets shortly pedicelled and subsecund, 3 mm. long, glaucous-green or purplish; lower glume minute, nerveless or faintly 1-nerved, upper glume and lemma finely 5-nerved; perennial I. ERIOCHLOIDEAE

Fertile lemma not mucronate; spikelets not arranged as above:

Spikelets more or less obtuse to shortly acute and plump, not gaping:

Spikelets oblong or narrowly oblong-elliptic, 2.5-5 mm. long; fertile glumes quite smooth; perennials:

Axes of the inflorescence and sometimes also the culms with clavellate-tipped hairs; spikelets 3-5 mm. long; lower glume usually $\frac{2}{3}$ the length of the spikelet or almost equally it, if shorter then truncate and 9-11-nerved; perennials II. CLAVELLIGERAE

Axes of the inflorescence glabrous or, if hairy, the hairs not clavellate; spikelets 2.5-4 mm. long, glabrous; lower glume very small, rarely half as long as the spikelet, nerveless or 1-3-nerved, rounded or subacute, upper glume and lemma 5-7-nerved; perennials III. MAXIMAE

Spikelets broadly elliptic to ovate or subglobose in outline, 1-2 mm. long, breaking up; fertile glumes usually warty; perennials or annuals

IV. VERRUCULOSAE

Spikelets acuminate or distinctly acute or apiculate, usually not plump (except in § *Durac*):

Spikelets much gaping early and permanently; glumes and lower valve more or less acuminate and often mucronulate or mucronate, finely keeled upwards with frequently slightly recurved tips V. HIANTEs

Spikelets not conspicuously and permanently gaping or only when mature; upper glume and lower valve with straight or slightly incurved tips:

Spikelets mostly very loosely scattered on long pedicels, or, if paired, on long fine branchlets, subulate-acuminate to acute; false fruits at length brownish to almost black VI. MILIACEAE

Spikelets more approximate on shorter pedicels, subobtusely, subacute or apiculate; pedicels 2-4 mm. long; false fruits whitish or yellowish:

Lower glume as long as or almost as long as the upper, 7-9-nerved; suffrutescent, with woody culms and hard pungent often much reduced leaf-blades VII. DURAE

Lower glume very small to up to half the length of the spikelet, few- or imperfectly-nerved:

Erect or procumbent caespitose perennials, usually with long more or less wiry stolons or runners, barren shoots often distichously leafy; leaf-blades firm to hard, often convolute to subulate or acicular; spikelets pale VIII. REPENTES

Erect perennials without long stolons or runners, or annuals; leaf-blades

- flat, usually long to very long, rarely convolute; spikelets pale green or vividly variegated or tinged with dark purple .. IX. COLOBATAE
- Spikelets 2-2.5 mm. long, ovate-oblong to lanceolate, acute, in rather delicate open panicles or with short ultimate divisions contracted on the primary branches; lower glume acute, as long or nearly as long as the spikelet, 3-nerved, or shorter to much shorter and then mostly much narrower than the lemma with the lateral nerves evanescent; perennials with many-noded culms and often sharply reflexed acuminate leaves .. X. MONTICOLAE
- ††Leaf-blades 0.5-2 cm. long, up to 5 mm. broad, linear-oblong to ovate-lanceolate; spikelets up to 2 mm. long, in small panicles 1.5-2.5 cm. long with rigid horizontally spreading or ascending branches; loosely tufted annuals or perennials, the latter with long trailing runners .. XI. PUSILLAE
- Lemma of lower floret 3-nerved; spikelets 2-3 mm. long, pubescent, in delicate panicles; lower glume hyaline, less than half the length of the spikelet, faintly 1-nerved, upper faintly 5-nerved; leaves linear-lanceolate .. XII. TRINERVES
- **Spikelets slightly oblique to gibbous in profile, 1-2 mm. long, loosely scattered in delicate open panicles; lower glume mostly 3-nerved, half as long to as long as the spikelet; upper glume and lemma 5-nerved; weak loosely tufted annuals with thin soft ovate or ovate-lanceolate leaf-blades much rounded at the base .. XIII. OVALIFOLIAE

I.—ERIOCHLOIDEAE

Perennial to over 1 m. high; culms rooting towards the base, 5- or more-noded, upper nodes exerted, shortly pubescent; leaves more or less glaucous; ligule a fine ciliate rim; blades linear-lanceolate, taper-pointed, up to 20 cm. long and 1.5 cm. broad; panicle up to 15 cm. long, lax; glumes very different, lower minute, truncate, hyaline, upper membranous, faintly 5-nerved .. 1. *Meyerianum*

II.—CLAVELLIGERAE

Culms ascending, with pubescent internodes, the pubescence mixed with club-shaped hairs; leaf-sheaths softly pubescent and with club-shaped hairs; ligule a short membranous ciliate rim; blades lanceolate from a rounded-subcordate base, tapered to the acute apex, 6-12 cm. long, 1.5-2.5 cm. broad, more or less pubescent; panicle lax, about 12 cm. long, with slender branches; spikelets about 3 mm. long .. 2. *lineatum*

III. MAXIMAE

Culms erect or suberect, stout, pilose at the nodes; leaf-sheaths bearded at the mouth; ligule ciliate, densely hairy behind it; blades linear from an equally wide or somewhat narrowed base, long-tapered to the apex, up to 0.75 m. long and about 2 cm. broad, very closely nerved, primary nerves up to 9 on each side; panicle lax, lower primary branches whorled, slender; spikelets oblong-elliptic, 3.5-4 mm. long .. 3. *maximum*

IV. VERRUUCULOSAE

Perennials:

Culms erect, stiff or only slightly geniculate, somewhat robust; leaf-blades 10 cm. to over 30 cm. long, 3-9 mm. broad:

Leaf-blades stiff, erect or suberect, glabrous or with some long cilia near the base, linear from a shortly rounded and constricted base, acute, 10-15 cm. long, 4-6 mm. broad, rough above and along the margins, closely nerved; panicle more or less enclosed at the base in the uppermost sheath, up to 15 cm. long; spikelets plump, rounded-elliptic, obtuse, nearly 2 mm. long, pale olive-green, glabrous or softly pubescent .. 4. *strictissimum*

Leaf-blades spreading or reflexed, 10-25 cm. long, 3-8 mm. broad, finely scabrid, usually hairy at the base above the ligule; sheaths ciliate; panicle 10-15 cm. long, at length lax and slender; pedicels up to 6 mm. long; spikelets plump, broadly ovoid-elliptic, subacute, pale green, about 2 mm. long, glabrous; glumes membranous, very distinctly nerved .. 5. *praealtum*

Culms slender to very slender, weak and usually geniculately ascending; leaf-blades narrow (2-4 mm.) and usually much under 15 cm. long:

Spikelets quite glabrous with a conspicuous bronze lustre, almost globose, about 2 mm. long; lower glume $\frac{1}{2}$ - $\frac{3}{4}$ the length of the spikelets; culms simple or sparingly branched below; leaf-blades linear from an equally wide base, sharply pointed, to about 12 cm. long and 6 mm. broad; panicle loose and open, to about 15 cm. long .. 6. *fulgens*

Spikelets pubescent, very rarely glabrous, dull and not lustrous, rounded-obovate or suborbicular, 1-1.5 mm. long; lower glume $\frac{1}{2}$ the length of the spikelet, 3-nerved, the upper equalling the spikelet and 5 nerved; leaf-blades linear, long-pointed, 5-10 cm. long, 2-3 mm. broad, rigid, loosely pilose above towards the base; panicle with filiform branches, up to 15 cm. long .. 7. *pubiglume*

Annuals :

Culms slender but not filiform; leaf-blades usually 2.5 cm. long or more; fertile floret distinctly verrucose :

Panicles open and loose with the ultimate divisions more or less spreading; pedicels 2-3 mm. long :

Spikelets quite glabrous, ovate to elliptic-oblong, about 2 mm. long; leaf-blades linear-lanceolate from a rounded or subcordate base, 5-9 mm. broad, 5-10 cm. long, firm, drying dark, very closely and finely nerved, glabrous or softly hairy; culms leafy up to the panicle, somewhat wiry; lower glume $\frac{2}{3}$ the length of the spikelet 8. *sublaetum*

Spikelets thinly pilose, ovate, 1.3 mm. long; leaf-blades broadly lanceolate, very acute, rounded and amplexicaul at the base, about 3 cm. long and 8-9 mm. broad, thinly pilose, closely nerved; panicle at length long-exserted from the uppermost sheath, delicate, obovate in outline, 7-9 cm. long, with numerous very slender branches; lower glume $\frac{2}{3}$ as long as the spikelet .. 9. *glaucocladum*

Spikelets broad- or rounded-elliptic or ovate, hairy; leaf-blades 2-3 mm. broad :

Spikelets with short and often scanty hairs, subacute, ovate, about 1.4 mm. long, pale green; glumes thin, almost as long as the spikelet, 3- and 5-nerved; ligule hyaline; leaf-blades linear, acute, 2.5-5 cm. long, 1.5-3 mm. broad, loosely hairy; panicle delicate, 6-10 cm. long, with capillary branches .. 10. *Lindleyanum*

Spikelets obtuse and rounded-elliptic in outline, 1.75 mm. long, tinged with violet, covered with spreading hairs almost as long as the spikelet; leaves as above, thinly pilose above; panicle about 2 cm. long, branches not capillary .. 11. *Trochainii*

Spikelets densely covered with long spreading hairs with bulbous-bases, elliptic, obtuse to subacute, 1.5 mm. long, pale green; glumes subequal, as long as the spikelet; leaf-blades pilose; panicle open and loose, 6-10 cm. long, with capillary branches 12. *hystrix*

Panicles more or less open but with the ultimate divisions contracted along the primary branches, divided to the third degree; pedicels 2-4 mm. long, wavy; ligules hyaline, truncate; leaf-blades linear from a sharply constricted base, up to 12 cm. long and 4 mm. broad, with fine long hairs towards the base above; spikelets broadly elliptic, obtuse, nearly 2 mm. long, pale green, loosely pubescent; lower glume nearly equalling the spikelet 13. *viciniflorum*

Culms finely filiform; leaf-blades up to 2 cm. by 1.5 mm.; spikelets ovate, acute, 1.5 mm. long, variegated with purple or brown, glabrous or sparingly pubescent; fertile floret almost smooth; glumes unequal, the lower acute, half as long as the spikelet, 3-nerved, upper acuminate equalling the spikelet, 5-nerved; panicle small, about 37 cm. long, very delicate, few-flowered 14. *filicaule*

V.—HIANTES

Perennials :

Upper glume and lemma 7-9-nerved :

Spikelets 3 mm. long, slender, ovate-lanceolate; a more or less reed-like grass with long wide blades, 30-60 cm. by 1-2 cm., linear from an equally wide or narrower base, long-tapered to a slender point, scabrid on the margins or rigidly ciliate downwards; panicle large and loose, the lower branches in whorls and up to 30 cm. long; spikelets soon gaping, tinged with purple or brown; lower glume ovate, acuminate, prominently 5-nerved 15. *phragmitoides*

Spikelets 3-4 mm. long, somewhat turgid, ovate-oblong or ovate-lanceolate; blades 15-23 cm. by 4-6 mm., linear from a wide base, glabrous except towards the ligules, distantly and minutely scabrid on the margin; lateral nerves numerous and very close; panicle lax; branches mostly rather scattered on the axis; lower glume acuminate, $\frac{1}{2}$ - $\frac{2}{3}$ as long as spikelet, 5-7-nerved 16. *anabaptistum*

Upper glume and lemma 5-nerved, or the former 7-nerved :

Compactly caespitose, the slender culms densely coated with the firm persistent leaf-bases; leaf-blades narrow, flat or setaceously convolute, 2-5 mm. broad when flattened out :

Panicles open, up to 4 cm. wide, delicate, very loose and somewhat stiff, often with extremely fine long hairs downwards; spikelets widely and obliquely gaping, variegated with purple and white, 1.5-2 mm. long; leaf-blades setaceously convolute, up to 2 mm. broad; lower glume lanceolate or ovate-lanceolate, mucronate, mostly 3-nerved 17. *congoense*

Panicles open, 5-10 cm. wide, glabrous; spikelets usually less and not so obliquely gaping, 2-3 mm. long; leaf-blades 2-5 mm. wide :

Spikelets 2 mm. long, oblong, acuminate, soon gaping, tinged with purple; panicle very loose, the divisions very fine; leaf-blades flat or setaceously convolute upwards; whole plant more or less hairy, except the panicle; lower glume $\frac{2}{3}$ the length of the spikelet, 5-nerved 18. *poeilanthum*

- Spikelets mostly 3 mm. long ; panicle less loose, the divisions less fine and stiffer ; lowest sheaths tomentose at the base ; leaf-blades flat or setaceously convolute, firm and more or less rigid ; culms 1-2-noded, up to 2 mm. diam. ; lower glume acuminate, $\frac{1}{2}$ - $\frac{3}{4}$ as long as the spikelet, finely 5-(7-) nerved 19. *Dregeanum*
Neither compactly caespitose nor with a dense coat of persistent leaf-bases :
Panicle with long spreading hairs from all axes ; glumes long-mucronate-acuminate, similar, half as long as the spikelet, lower 3-nerved ; leaf-sheaths softly pilose, shorter than the internodes ; blades shortly pubescent, with prominent nerves

20. *Pilgeri*

Panicle glabrous :

- Culms simple, reed-like, stout, 1-2 m. high, 4-6-noded ; leaf-blades 15-45 cm. by 4-10 mm. ; panicle 15-35 cm. by 5-12 cm. ; upper glume faintly 5-nerved, the lower $\frac{1}{2}$ - $\frac{3}{4}$ as long as the spikelet, mucronate-acuminate ; spikelets pale or purple 21. *aphanoneurum*

- Culms slender, more or less branched ; upper glume usually 7-nerved :

- Culms up to 9-noded ; leaf-blades up to over 30 cm., firm and tough ; lower glume acute or acuminate, distinctly 5-nerved, $\frac{1}{2}$ - $\frac{3}{4}$ the length of the lower floret ; ultimate branches of panicle filiform, scaberulous ; spikelets more or less gaping, 2-2.75 mm. long 22. *Rowlandii*

- Culms about 4-noded ; leaf-blades 10-20 cm. ; lower glume with obscure side-nerves, $\frac{2}{3}$ - $\frac{3}{4}$ the length of the lower floret ; panicle very slender, branches filiform ; pedicels 3 mm. long, slender ; spikelets early gaping, 2.5-3 mm. long 23. *fluviicola*

Annuals :

- Spikelets pilose, oblong, acutely acuminate, early gaping, about 2 mm. long, pale green ; whole plant including the panicle finely pilose ; lower glume 5-nerved, $\frac{3}{4}$ - $\frac{1}{2}$ the length of the spikelet ; leaf-sheath and blade densely pilose with weak spreading hairs, the blade with strong primary nerves below 24. *Griffonii*

Spikelets glabrous ; lower glume 3-1-nerved :

- Lateral pedicels 6-12 mm. or more long, very slender and flexuous ; panicles mostly in tiers of 2-3, open and very loose, glabrous ; spikelets oblong, acutely acuminate, soon gaping, 2.5 mm. long, yellowish green or purplish ; lower glume setaceously acuminate, $\frac{2}{3}$ as long as the spikelet, 3-nerved 25. *paucinode*

Lateral pedicels 2-6 mm. long :

- Spikelets more or less but not very widely gaping, 2 mm. long, narrowly ovate ; leaf-sheaths ciliate upwards, purplish ; leaves glabrous except the margin, up to 15 cm. long ; panicle open and loose, forming a bushy interlace ; lower glume about $\frac{1}{2}$ as long as the spikelet, mucronate-acuminate 26. *humile*

- Spikelets widely and often obliquely gaping, 2 mm. long, the glumes spreading nearly at a right angle ; leaf-blades sparingly setulose-pilose, up to 12 cm. long ; lower glume aristate-acuminate, about $\frac{1}{2}$ as long as the spikelet 27. *Afzelii*

VI.—MILIACEAE

Spikelets up to 3 mm. long :

- Spikelets usually in pairs, contiguous and shortly pedicelled at the ends of long finely filiform sparingly divided more or less flexuous branches and their branchlets ; panicles terminal, up to 50 cm. long when mature, widely open ; lower floret barren with a much reduced ovate or triangular valvule with obscure basal flaps ; leaf-sheaths hirsute upwards with tubercle-based hairs, rigidly ciliate ; blades pilose with tubercle-based hairs ; spikelets ovate-oblong, acuminate ; lower glume $\frac{1}{2}$ - $\frac{3}{4}$ the length of the spikelet, 7-nerved 28. *Kerstingii*

- Spikelets usually distant often on long pedicels or relatively shorter and more numerous branchlets ; panicles terminal and lateral, 5-15 cm. long ; lower floret barren with valvule $\frac{1}{2}$ the length of the valve and with distinct flaps ; leaf-sheaths glabrous or pilose with tubercle-based hairs, closely nerved ; blades glabrous or thinly pilose towards the base ; spikelets ovate, acute ; lower glume $\frac{1}{2}$ as long as the spikelet, 7-9-nerved 29. *laetum*

- Spikelets 5-6 mm. long, acuminate, oblong-lanceolate, tinged with purple ; panicle open, 20-30 cm. long, with spreading branches up to 15 cm. long, the main axils villous ; lower glume acute, $\frac{1}{2}$ as long as the spikelet, upper equal ; leaf-sheaths with densely ciliate margins ; leaf-blades villous above the ligule 30. *nigerense*

VII.—DURAE

- Suffrutescent, glaucous, bush-like ; cataphylls ovate to oblong, finely pubescent to tomentose at the base ; culms terete, woody, solid, many-noded, frequently producing fascicles of numerous short or long branches from the nodes ; leaf-sheaths below the branches soon drying up and becoming straw-coloured ; blades tapering to a fine pungent point, rigid, sometimes reduced to mere sharp points ; panicles rather small ; spikelets ovoid, acute, 4 mm. long ; lower glume nearly as long as the spikelet

31. *turgidum*

VIII.—REPENTES

Perennial; barren shoots distichously leafy; leaf-sheaths longer than the internodes, ciliate; ligule a membranous ciliate rim; blades tapered to a callous point, up to 20 cm. long, more or less involute, rigid, glaucous, very closely nerved; panicle small, erect, stiff; spikelets ovate, oblong, acute, about 3 mm. long; glumes very unequal, lower small, short, very broad and subhyaline. 32. *repens*

IX.—COLORATAE

Hygrophilous grasses with lax panicles of more or less acuminate spikelets 2.5 mm. long and pale green or rarely uniformly suffused with purple; culms stout, soft; leaf-blades broadly linear from a slightly constricted base, long-tapered to an acute point, up to 30 cm. long and 1.5 cm. broad, primary lateral nerves up to 8 on each side; spikelets lanceolate, acuminate, 2.5 mm. long, pale green; glumes very unequal, lower broadly ovate, small 33. *longijabatum*

X.—MONTICOLAE

Lower glume very much shorter than the spikelet:

Spikelets with a tuft of fine long hairs from the acute tip of the upper glume, 2–2.5 mm. long; leaf-blades broadly lanceolate, rounded at the base, narrowly acuminate, about 7 cm. long and 1.5 cm. broad, thinly pilose, ciliate towards the base; panicle about 15 cm. long 34. *acrotrichum*

Spikelets glabrous, acute, to over 3 mm. long; leaf-blades lanceolate, broadly acuminate, 4–5 cm. long, 1 cm. broad, glabrous or nearly so; panicles very small, shortly exserted 35. *monticola*

Spikelets as above, but in large weak very loose panicles; leaves much longer, about 10 cm. long 36. *calvum*

Lower glume as long or almost as long as the spikelet:

Spikelets lanceolate, slightly oblique in profile, in panicles up to 30 cm. long; glumes quite equal and as long as the spikelet, faintly nerved, thinly pilose; leaf-blades 5–15 cm. long, 1.2–2.2 cm. broad, broadly lanceolate, acutely acuminate, with 3 principal nerves on each side of the midrib 37. *subobliquum*

Spikelets oblong to ovate-oblong, symmetrical in profile, in long-exserted widely open or sometimes contracted panicles 5–8 cm. by 5 to over 8 cm.; lower glume about $\frac{1}{2}$ the length of the spikelet, like the upper and the lower valve prominently nerved from the base upwards; leaf-blades reflexed, up to 7 cm. by 4 mm., glabrous or softly pubescent on each side 38. *Hochstetteri*

XI.—PUSILLAE

Inflorescence without gland-tipped hairs:

Annual; culms very weak; leaf-blades soft, lanceolate, about 2 cm. long, pilose; spikelets oblong-lanceolate, 2 mm. long; lower glume $\frac{3}{4}$ – $\frac{1}{2}$ the length of the spikelet or almost as long, 3-nerved; panicles very small, exserted 39. *pusillum*

Perennial; culms filiform, wiry; leaf-blades rather rigid, lanceolate, rounded and clasping at the base; spikelets 1–1.5 mm. long, subacute; lower glume much shorter than the spikelet, ovate, 3-nerved; panicles small, with filiform branches and pedicels 40. *parvifolium*

Inflorescence with gland-tipped hairs, very small, about 3 cm. long; leaf-blades soon reflexed, up to 4 cm. long, shortly pubescent 41. *djalonense*

XII.—TRINERVES

Spikelets lanceolate, acute, very loosely and minutely hairy, 2 mm. long; lower glume acute; culms weak, rooting at the lower nodes; leaves about 4 cm. long and 5 mm. broad; panicle 6 cm. long; pedicels very slender 42. *microthyrsus*

XIII.—OVALIFOLIAE

Lower glume broadly ovate, up to half the length of the spikelet; spikelets 1 mm. long, elliptic, obtuse, greenish, finely pubescent; panicle very lax, up to 45 cm. long, with very filiform branches and pedicels; leaves lanceolate, acutely tapered, rounded and constricted at the base, 4–7 cm. long 43. *trichoides*

Lower glume as long as and narrower than the spikelet, lanceolate, 1.5 mm. long, hyaline, 3–(1-)nerved; panicles at length exserted, open, delicate, up to 15 cm. long; pedicels up to 1.2 cm. long; leaves ovate or ovate-lanceolate, acuminate, rounded-subcordate at the base, about 7 cm. long and 2.5 cm. broad, ciliate, glabrous or pilose 44. *brevifolium*

1. *Panicum Meyerianum* Nees—F.T.A. 9: 650.

Gold Coast: without locality! Widely distributed in E. Africa, Arabia, and Natal. Exsicc.—Irvine 1427.

2. *P. lineatum* Trin.—F.T.A. 9: 653. *P. scandens* Mez. Perennial about 3 ft. high in partial shade, weakly erect.

Sierra Leone: various localities! Liberia near Kakatown! Banga (Oct.)! Rippue's Town (Aug.)! Sinoe (Nov.)! Exsicc.—Morson. Thomas 3015; 3037; 4049; 6782; 7049; 7107. Glanville 71. Deighton 329; 906. Johnston. Linder 371; 1191. Dinklage 2326.



FIG. 366.—*Panicum maximum* Jacq. (GRAMINEAE-PANICACEAE).

A, ligule. B, spikelet. C, lower glume. D, upper glume. E, upper floret showing lemma. F, stamens and pistil.

3. *P. maximum* Jacq.—F.T.A. 9: 655; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 20; Holl. 833. *P. sparsum* Schumacher. Perennial up to about 10 ft. high, densely tufted on a stout rhizome; panicle slender, up to 1½ ft. long.
In moist places by streams and ditches throughout the area from Portuguese Senegambia to Nigeria, and throughout Africa, Mascarenes and Arabia; introduced into India and America.
4. *P. strictissimum* Afz. ex Sw.—F.T.A. 9: 666; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 20. Perennial, 1–4 ft. high in moist sandy places; culms erect, sparingly branched.
Sierra Leone: Mabum (Aug.)! Kitchom (Jan.)! Exsicc.—Thomas 1540; 1571; 1631. Deighton 934. Afzelius.
5. *P. praecalum* Afz. ex Sw.—F.T.A. 9: 667; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 20. Stiffly erect perennial, 2–3 ft. high in savanna.
French Guinea: Futa Jallon, Kouria! Between Kouria and Trebeleya (Sept.)! Sierra Leone: Mabum (Aug.)! Binkolo (Aug.)! Yabaya (Sept.)! Mabonto-Bunbuna (Aug.)! Togo! Exsicc.—Chev. 18229; 19010. Thomas 1669; 1878; 2284. Deighton 1393. Baumann 354.
6. *P. fulgens* Stapf—F.T.A. 9: 668. *P. globulosum* Mez. Perennial, up to 2 ft., forming large tufts; culms erect or ascending, slender, rooting from the lowest nodes.
Southern Nigeria: Lagos, by water! Also in Eastern Sudan and Congo. Exsicc.—MacGregor 166.
7. *P. pubiglume* Stapf—F.T.A. 9: 670; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 20. Perennial up to 4 ft. high in swamps; culms slender, many-noded, nodes not or only shortly exerted; fairly common.
French Sudan: Sikasso (May)! N. Nigeria: Nupe! Abinal, in the bush (June)! Baro (Oct.)! Lokoja! Exsicc.—Chev. 805. Barter 1013. Dalz. 899. Parsons 13. Richardson.
8. *P. sublaetum* Stapf—F.T.A. 9: 671; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 21. *P. Dinklagei* Mez. Annual up to 1½ ft. or higher and straggling over bushes; nodes exerted; leaves long-acuminate, rounded-cordate at the base, spreading at a wide angle.
Common in dry country and waste places from French Guinea and Sierra Leone to Northern Nigeria and Cameroons Mt. Exsicc.—Pobéguin 523; 1723; 1822. Reade. Thomas 7642. Deighton 1222; 1327; 1641; 2153. Glanville 61; 96. Johnston. Linder 1863. Dalz. 892. Migeod 60. Dinklage 2282.
9. *P. glaucocladum* C. E. Hubbard in Kew Bull. 1933: 501. Tufted annual along sandy roads in light shade of oil palms; basal nodes rooting; lower internodes glaucous-purple; spikelets very small.
Sierra Leone: near Toma, Bonthe Island (Nov.)! Exsicc.—Deighton 2282.
10. *P. lindleyanum* Nees ex Steud.—F.T.A. 9: 673; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 21. A frail-looking tufted annual up to 2 ft. high in moist sandy places.
French Sudan: Koulikoro (Oct.)! French Guinea: Kouroussa (Dec.)! Sierra Leone: Kitchom (Jan.)! Brookfields (Oct.)! Tombo (Jan.)! Exsicc.—Chev. 2178. Pobéguin 541. Deighton 935; 947; 995; 2174.
11. *P. trochianthi* A. Camus—F.T.A. 9: 1098; A. Camus in Bull. Mus. Nat. Hist. Par. Ser. 2, 6: 99. *Isachne Trochianthi* A. Camus. Closely allied to the preceding, but with very small panicles, tinged with violet.
Senegal: Casamance, near Bignona (Feb.)! Exsicc.—Trochain 1438; 1472.
12. *P. hystrix* Steud.—F.T.A. 9: 674; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 21. Slender annual (?) with pilose leaves and much exerted diffuse slender panicle of pale densely pilose spikelets.
Portuguese Guinea: Los Island. Senegal! Exsicc.—Jardin. Heudelot 583.
13. *P. viciniflorum* Stapf—F.T.A. 9: 674; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 21. Annual up to 3 ft.; nodes exerted; leaves tapering to a fine point.
French Sudan: dry ground near Segu! Exsicc.—Lécard 250.
14. *P. filicalea* Stapf—F.T.A. 9: 675; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 21. Very delicate annual up to 1 ft. high with very small leaves loosely pilose all over.
French Guinea: Futa-Jallon, between Memon and Trebeleya (Sept.)! Exsicc.—Chev. 8622 bis.
15. *P. phragmitoides* Stapf ex Chev.—F.T.A. 9: 677; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 21. A perennial up to 6 ft. high with large loose slender panicles divided to the fourth or sixth degree.
French Guinea: Baffing R. (Oct.)! Probably also at Lagos! (material imperfect). Extends through the Ubangi and Congo to Nyasaland and Angola. Exsicc.—Pobéguin 1823.
16. *P. anabaptistum* Steud.—F.T.A. 9: 678; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 22; Holl. 832. *P. glaucofolium* Hitchc. *P. Klingsi* Mez. *Garnotia africana* Janowski. A perennial in moist places up to 5 ft. high; panicle 2–1 ft. long.
French Sudan: San (Sept.)! Kabarah (Sept.)! Mossi (Sept.)! Zinder (Nov.)! Senegal: Walo! Richard Tol (Feb.)! N. Nigeria: Nupe! Sokoto (Sept.)! Extends to the Shari and French Cameroons. Exsicc.—Chev. 2274; 2285; 24487. King 234. Hagerup 304; 616. Heudelot 286. Dollinger 81. Barter 833. Dalz. 27; 490.
17. *P. congoense* Franch.—F.T.A. 9: 682. A compact perennial with delicate inflorescences resembling small "Quaking grass."
Sierra Leone: Kitchom (Jan.)! Liberia: Duport (Nov.)! S. Nigeria: Old Calabar! Extends to Portuguese Congo. Exsicc.—Deighton 937. Linder 1461. Robb. Kingsley.
18. *P. poecilanthum* Stapf—F.T.A. 9: 684. Perennial up to 3 ft. high, compactly caespitose; sheath-bases persistent; panicle very slender, with very numerous purplish spikelets.
Cameroons! Exsicc.—Unwin 9185.
19. *P. dregeanum* Nees—F.T.A. 9: 684; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 22; Holl. 833. Erect about 3–4 ft. high, with fairly dense panicles of purple-tinged spikelets.
N. Nigeria: in damp pastures near Abinal (July)! Naraguta! Generally distributed in tropical Africa and in the Transvaal and Natal. Exsicc.—Dalz. 897. Lely P. 423; P. 427.
20. *P. pilgeri* Mez—F.T.A. 9: 686. *P. chilianthum* Chev. Bot. 725, partly, not of Stapf. Perennial up to 4 ft. in open plains; panicle 6–9 in. long, pale or purplish.
French Guinea: Kouroussa (Aug.)! Ivory Coast: Mankono Circle (July)! N. Nigeria: Nupe! Exsicc.—Pobéguin 500. Chev. 21981. Barter 1377.
21. *P. aphanoneurum* Stapf ex A. Chev.—F.T.A. 9: 687; Chev. Bot. 724, and Rev. Bot. Appl. Agric. Trop. 1934: 22. *P. purpurascens* Mez. Perennial and reed-like up to 7 ft. on flooded land and along streams or moist places in the bush; panicle up to more than 1 ft.; leaf-sheaths shorter than the internodes.
French Guinea: Baffing River (Sept.)! French Sudan: various localities! Sierra Leone: stream near Masuri (Oct.)! N. and S. Nigeria: various localities (Oct.–Jan.)! Extends to Bongoland and through the Congo to the Victoria Falls. Exsicc.—Pobéguin 493; 1720; 1721; 1730. Chev. 2189; 2190; 2272; 2273; 24950. Lecard 251. Barter 343; 728. Dalz. 253; 905; 1328; 1330. Hagerup 693. Holland 280.
22. *P. Rowlandii* Stapf—F.T.A. 9: 688. A slender grass 1½–2½ ft. high; spikelets pale or tinged with purple, very acute when young.
S. Nigeria: near Lagos! at edge of marsh (Oct.)! on the Niger (Sept.)! Exsicc.—Vogel 24. Rowland. Dalz. 1329.
23. *P. fluviicola* Steud.—F.T.A. 9: 689. Perennial over 2 ft. high, with slender flexuose panicles.
S. Nigeria: Old Calabar! Also in Cameroons, Gabon and Belgian Congo. Exsicc.—Robb.
24. *P. Griffonii* Franch.—F.T.A. 9: 691; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 22. A tufted annual up to 3 ft. high, usually branched all along, usually about 6-noded.
Sierra Leone: Mabound, 550 ft. (Oct.)! S. Nigeria: Lagos! Ebute Metta (Nov.)! Extends to Ubangui and Angola. Exsicc.—Thomas 3662. Millen 13. Dawodu 186.
25. *P. paucinode* Stapf—F.T.A. 9: 692. A tufted annual 1–2 ft. high; culms sometimes rooting at the lower nodes; leaf-sheathed purplish; spikelets pale yellowish-green or purple.
N. Nigeria: abundant in the bush near Yola (Aug.)! Bauchi Plateau! Exsicc.—Dalz. 270. Lely 774; 786.

26. *P. humile* Nees ex Steud.—F.T.A. 9: 693; Chev. Bot. 726, and Rev. Bot. Appl. Agric. Trop. 1934: 23. Senegal: Tamboukané (Dec.)! Mbouhou, near Matam (Dec.)! N. Nigeria: Nupe! Kano (Dec.)! Also in India. Exsicc.—Chev. 2234; 2235. Barter 886B. Moiser 201. Hagerup 666.
27. *P. Atzeli* Sw.—F.T.A. 9: 695; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 23. A tufted annual about 1 ft., with white panicles of very small widely gaping spikelets on slender pedicels. French Guinea: Timbo, in dry ground! Between Sombalako and Boulivel (Sept.)! Sierra Leone: near Regent (Dec.)! Magbille (Dec.)! Kambia, dry sandy places (Jan.)! Brookfields (Oct.)! Exsicc.—Pobéguin 1716; 1717. Sc. Elliot 4115. Thomas 6467. Deighton 914; 2143.
28. *P. Kerstiniae* Mez.—F.T.A. 9: 699; Chev. Bot. 727, and Rev. Bot. Appl. Agric. Trop. 1934: 23. An annual 2 ft. high, usually markedly pilose; panicles slender, at first embraced by the upper leaf-sheath. Togo. S. Nigeria: Lagos! Aguku Distr.! N. Nigeria: Nupe! Bauchi Plateau! Also in French Cameroons and Portuguese Congo. Exsicc.—Barter 1374. Lely 770. Dawodu 155. Thomas 623; 660; 696; 956.
29. *P. laetum* Kunth.—F.T.A. 9: 700; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 23; Holl. 833. A more or less tufted glabrous or pilose annual 1–2 ft. high, with loose small panicles of pale green spikelets. Senegal. French Sudan: Mossi (July)! near Ouatala! Labezenga (Sept.)! Sompi (Aug.)! Takadji (Aug.)! N. Nigeria: Katagum! Also in Mauritania and Bagirmi. Exsicc.—Chev. 2276; 2281; 24599. Hagerup 4416. Dalz. 262.
30. *P. nigerense* Hitchc. in Proc. Biol. Soc. Wash. 43: 90 (1930). A little known grass allied to *P. callosum* Hochst. from E. Sudan and Abyssinia. French Sudan: Niamez (Oct.)! near Macina (Sept.)! Exsicc.—Hagerup 481. Chev. 24911.
31. *P. turzidum* Forssk.—F.T.A. 9: 706; Chev. Bot. 730, and Rev. Bot. Appl. Agric. Trop. 1934: 24. Hard and woody, up to 4 ft. with stout roots and long slender internodes. Senegal! French Sudan: Timbuctu (June–July)! Silet, in depressions (Mar.)! Also in Mauritania, across the Sahara to N.E. Trop. Africa, Eastern Mediterranean and eastwards to Scind. Exsicc.—Heudelot 393. Hagerup 97. Chev. 1221. Chipp 85.
32. *P. repens* Linn.—F.T.A. 9: 708; Chev. Bot. 729, and Rev. Bot. Appl. Agric. Trop. 1934: 25; Holl. 836. Perennial up to 2 ft. high; rhizome long and creeping. Widely distributed on or near tropical and subtropical coasts of both hemispheres; also along rivers inland.
33. *P. longijubatum* Stapf.—F.T.A. 9: 718; Holl. 833. *P. glabrescens* Steud. *P. proliferum* var. *longijubatum* Stapf.—Chev. Bot. 728. Perennial to 4 ft., from a short and early disintegrating rhizome. French Guinea and French Sudan: various localities (July–Sept.)! Sierra Leone: Bumban (Sept.)! Binkolo (Sept.)! Gold Coast: Christiansborg (Apr.)! N. Nigeria: Sokoto! Katagum! Naraguta! Extends to Eritrea and South Africa. Exsicc.—Hagerup 376; Pobéguin 483. Thomas 1938. Deighton 1231; 1282. Johnson 1028; 1032. Dalz. 289; 483. Lely 421; P. 426; 777.
34. *P. acrotrichum* Hook. f.—F.T.A. 9: 721. A straggling grass among bushes in forest. Cameroons Mt.: 7,000 ft. (Dec.)! Buea, 3,300 ft. (Jan.)! Exsicc.—Mann 2100. Maitland 344.
35. *P. monticola* Hook. f.—F.T.A. 9: 722. Stems flexuose, weak, about 1 ft. high. Cameroons Mt.: 7,000 ft. (Feb.)! Buea, 4,500 ft. (Jan.)! Also in East Africa. Exsicc.—Mann 1353. Maitland 338.
36. *P. calvum* Stapf.—F.T.A. 9: 723. Like the last but more straggling and taller. Cameroons Mt.: 1,000–5,500 ft. (Dec.–Jan.)! Also in East Africa. Exsicc.—Maitland 327; 850; 1266.
37. *P. subobliquum* Stapf.—F.T.A. 9: 723; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 26. French Guinea: Futa Jallon; Dalaba Plateau, 3,000–4,250 ft.! Exsicc.—Chev. 18755.
38. *P. Hochstetteri* Steud.—F.T.A. 9: 724. *P. mokaense* Mez. Perennial up to 3 ft. high with weak stems and narrow reflexed leaves. Cameroons Mt.: 7,000 ft. (Dec.)! Above Buea, 4,500 ft. (Nov.)! Buea, 3,000 ft. (Jan.)! Fernando Po: Moka, 3,700–5,500 ft. (Nov.)! Also in St. Thomas and in N.E. Trop. Africa from Eritrea to Uganda. Exsicc.—Mann 1343; 2082. Migod 133. Maitland 328. Mildbr. 7086.
39. *P. pusillum* Hook. f.—F.T.A. 9: 725. A small weak annual with very small panicles of few green spikelets. Cameroons Mt.: 7,000–8,000 ft. (Dec.)! Also in Abyssinia (Mt. Hedja, 9,000 ft.)—Exsicc.—Mann 2090.
40. *P. parvifolium* Lam.—F.T.A. 9: 726; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 26. A very neat wiry swamp grass with trailing rooting stolons and small lanceolate leaves with rounded clasping bases. Senegal: near Albida (June)! Sierra Leone: Mayoso (Aug.)! Magbille (Dec.)! Newton (Nov.)! Njala (Sept.)! Liberia: Duport (Nov.)! Suah Koko (Sept.)! S. Nigeria: Lagos Island! Ikoyi Plains, edge of pools (Sept.)! Opobo (July)! Aguku! Extends to Congo; also in Madagascar and tropical South America. Exsicc.—Thomas 733; 1503; 6277. Deighton 1448; 2099. Linder 375; 1458. Barter 2221. Dalz. 1319. Jeffreys 17.
41. *P. djalonenae* A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 27. French Guinea: Maïn R., at Dalaba (Apr.)! Exsicc.—Caillé 18139 bis.
42. *P. microthyrsus* Stapf.—F.T.A. 9: 729. Perennial, freely rooting from the lower nodes. S. Nigeria: Bassa, near Duala (Feb.)! Also in Belgian Congo. Exsicc.—Dalz. 8428. Although not quite within our area, I include this in case it occurs at the foot of Cameroons Mt.
43. *P. trichoides* Sw.—F.T.A. 9: 730. Annual up to 1½ ft. high; culms and leaf-sheaths spreadingly pilose with bulbous-based hairs. Gold Coast: Mansu! S. Nigeria: Degema (Sept.)! Eruwa (May)! Widely distributed in tropical America and often a weed of cultivation. Exsicc.—Cummins 11. Holland 135. Thomas 1760.
44. *P. brevifolium* Linn.—F.T.A. 9: 731; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 26. A distinctive grass usually in shady places, with ovate amplexicaul leaves and short panicles of small spikelets subtended by the uppermost leaf. French Guinea and Sierra Leone to Cameroons Mt. and Fernando Po, and in most other parts of tropical Africa and throughout tropical Asia.

Note.—Chevallier, Rev. Bot. Appl. Agric. Trop. 1934: 24, records *P. atosanguineum* Hochst. from Segou, French Sudan, and on p. 25 *P. hygrocharis* Steud., from Senegal and the French Sudan.

P. laxum Sw., a native of tropical America, has been collected several times in Sierra Leone (Deighton 673; 732; 1029; 1457; 2192; 2343. Glanville 155), and may be at once distinguished from the native species by its habit, like *Brachiaria*, with short lateral second branches of the panicle.

69. ICHANTHUS P. Beauv.—F.T.A. 9: 743.

Perennial, up to 60 cm. high; culms leafy, slender, rooting at the lower nodes; leaf-sheaths 1.5 cm. long, much shorter than the internodes, prominently nerved, thinly pilose; ligule a ciliolate rim; leaf-blades broadly lanceolate, oblique and rounded on one side at the base, subacutely acuminate, 5–6 cm. long, 1.5–2 cm. broad; main lateral nerves about 3–4 on each side of the midrib, with less prominent nerves between; panicles terminal and lateral; axis sharply angular; lower glume lanceolate, acuminate, 5-nerved, nearly glabrous, greenish . . . *pellens*

I. pallens Munro—F.T.A. 9: 744; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 27.
Sierra Leone: Mamaha (Nov.)! Also in Cameroons and in tropical America, Indo-Malaya to New Guinea and Queensland. Exsicc.—Thomas 4571; 4635.

70. CYRTOCOCCUM Stapf—F.T.A. 9: 745.

Perennial, up to 1 m. high; culms slender, ascending from a decumbent base; internodes mostly a little shorter than the leaf-sheaths, the latter inrolled, minutely ciliate along the outer margin, bearded at the top, otherwise glabrous; blades narrowly lanceolate, to broadly linear, very acute, 9–12 cm. long, 1–1.5 cm. broad, thin, with 3 main nerves on each side of the midrib and faint nerves between, prominently ciliate near the base; panicles slender, broadly oblong in outline, the base enclosed in the uppermost leaf-sheath, about 15 cm. long; branches wavy, slender, bearing a solitary spikelet at the end; spikelets broadly ovate, about 2 mm. long, dark brown; glumes very unequal, lower $\frac{1}{2}$ as long as the lower floret, thinly pilose *setigerum*

C. setigerum Stapf—F.T.A. 9: 746; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 27. *Panicum setigerum* P. Beauv. Fl. Owar. 1: 82, t. 49.
Sierra Leone: Njala, frequent in light shade (Nov.)! Liberia: near Kakatowa! Gold Coast: Amentia, Ashanti! Aburi! 8. Nigeria: Kappa Road (Oct.)! Lagos! Extends to Angola. Exsicc.—Deighton 1495. Whyte. Irvine 36; 466. Johnson 236. Parsons 28. MacGregor 312.

71. SACCOLEPIS Nash—F.T.A. 9: 747.

Spikelets up to 1 mm. long; basal leaf-sheaths loose, spongy, the upper tight and narrow, rounded at the top; blades very narrow, folded, acute, up to 15 cm. long; false spikes long-exserted, up to 13 cm. long; pedicels very short, persistent, with discoid tips; glumes very thin, upper 7-nerved, as large as the spikelet .. 1. *micrococca*

Spikelets over 1 mm. long:

Spikelets 1.5–2 mm. long, puberulous; leaf-sheaths as above; blades erect, filiform, subterete, glabrous; false spikes long-exserted, up to 12 cm. long; pedicels and glumes as above 2. *Chevalieri*

Spikelets 2–3 mm. long:

Spikelets oblong, obtuse to subacute, dorsally slightly compressed to almost terete; leaf-sheaths rather loose; blades broadly linear, 5–8 mm. broad, taper-pointed, scabrid on the margins; false spikes dense, up to 30 cm. long; upper glume prominently 9-nerved 3. *interrupta*

Spikelets broadly ovate, acuminate, laterally compressed, asymmetric with the lower floret narrowly boat-shaped and gibbous and hardened below; uppermost leaf-sheath very long; false spikes very long and slender, up to 35 cm. long, dense; upper glume 9-nerved 4. *cymbiandra*

Spikelets 3–3.5 mm. long, ovate, subacute to acutely acuminate, usually conspicuously hairy; false spikes much shorter than all the above, rarely up to 15 cm. long, dense; upper glume 7–9-nerved 5. *auriculata*

1. *S. micrococca* Mez—F.T.A. 9: 753; A. Chev. in Rev. Bot. Appl. Agric. Trop. 1934: 28.
Senegal! French Guinea: Kouroussa! N. Nigeria: Borgu! Also in Eastern Sudan. Exsicc.—Heudelot 551. Pobéguin 536. Barter 759.

2. *S. Chevalieri* Stapf—F.T.A. 9: 753; Chev. l.c.
French Sudan: between Sanguiana and Moussaia (Feb.)! Dahomey: Atacora Mts., Somba country (June)! Also in the Shari and Uganda. Exsicc.—Chev. 466; 24186.

3. *S. interrupta* Stapf—F.T.A. 9: 757; Chev. l.c.; Holl. 836. In grassy swamps and rice fields; rhizome creeping; culms spongy, 4–5 ft.

French Sudan to N. and S. Nigeria and in tropical Africa generally. Exsicc.—Chev. 43048; 43120. Pobéguin 1740. Deighton 1315; 1993. Linder 521. Dalz. 478. Lely 327. (See Appendix).

4. *S. cymbiandra* Stapf—F.T.A. 9: 758; Chev. l.c. 29.
French Guinea: Baffing Valley, in water! Sierra Leone: Maboud (Oct.)! Kambia (Dec.)! Gold Coast! Exsicc.—Pobéguin 1746. Thomas 3555. Deighton 804. Beal 45.

5. *S. auriculata* Stapf—F.T.A. 9: 762; Chev. l.c. 29. *S. rigens* A. Chev. *Panicum rigens* Mez.
French Guinea: Baffing Valley! Sierra Leone: Makump (Dec.)! Njala (Nov.)! Fogo: Sokode-Basari! N. Nigeria: Borgu! Zaria! Extends to Uganda and Angola. Exsicc.—Pobéguin 1745. Deighton 98; 1430. Barter 732. Kersting 595.

72. SETARIA P. Beauv.—F.T.A. 9: 768. (See Appendix).

Inflorescence spiciform, unbranched:

Bristles short and inconspicuous, only slightly exceeding the width of the inflorescence, the latter slender, 10–12 cm. long, the rhachis softly tomentose; leaf-blades 5–10 cm. long, glabrous; spikelets elliptic, glabrous, pale; lower glume very broadly ovate, 3-nerved, about $\frac{1}{2}$ the length of the spikelet, upper glume a little longer and 5-nerved; valve of the upper floret finely transversely rugose 1. *tenuispica*

Bristles comparatively long, half as long again as the width of the inflorescence or more:

Leaf-sheaths flabellately imbricate in one plane, compressed and acutely keeled; inflorescence 10–26 cm. long, with yellowish bristles; rhachis villous-tomentose; spikelets broadly elliptic, 2 mm. long, pale or purplish; lower glume broadly ovate, 3–5-nerved, upper similar, but about half the length of the spikelet and 5-nerved; male of the upper floret finely transversely rugose 2. *anceps*

Leaf-sheaths not as above :

Perennials ; inflorescence usually rather long (10 cm. or more) :

Spikelets usually in clusters of 2-3 ; bristles finely scabrid, 6-10 to each involucre ; lower glume 3-nerved, $\frac{1}{2}$ the length, the upper about $\frac{2}{3}$ the length of the spikelet ; leaf-blades 15-30 cm. long, usually glabrous ; valve of upper floret distinctly rugose 3. *sphacelata*

Spikelets solitary, in a rather lax inflorescence ; bristles thread-like, minutely scabrid, up to 1 cm. long, about 10-12 to each involucre ; lower glume $\frac{1}{2}$ to nearly $\frac{1}{2}$ as long, upper about $\frac{2}{3}$ the length of the spikelet ; leaf-blades up to 15 cm. long 4. *laxispica*

Annuals :

Upper glume much shorter than the upper floret ; inflorescence usually short (rarely up to 10 cm. long) ; bristles 2-3 times as long as the spikelets, scaberulous ; spikelets 2-5 mm. long ; upper floret transversely rugose ; lower glume about $\frac{1}{2}$, upper glume about $\frac{1}{2}$ as long as the spikelet ; leaf-blade often with long white hairs at the base 5. *pallidifusca*

Upper glume as long or nearly as long as the spikelet ; inflorescence very variable in length ; bristles 4-8 mm. long, retrorsely barbellate ; leaves usually thinly pilose 6. *verticillata*

Inflorescence paniculate :

Axis of panicle and bristles glabrous or very minutely scabrid ; panicle often purplish, open, branches loosely spiculate, with few bristles ; leaf-sheaths softly ciliate towards the top ; spikelets 2-2.5 mm. long ; lower glume rounded-ovate, about $\frac{1}{2}$ the length of the spikelet, 3-5-nerved, upper $\frac{2}{3}$ the length of the spikelet ; leaf-blades linear 7. *longisetata*

Axis of panicle and bristles hairy :

Perennials with stout culms and broad leaves ; panicles with rather long lateral branches ; valve of upper floret smooth or nearly so :

Spikelets up to 3 mm. long :

Inflorescence dense, erect, with second rigid branches, the lowermost not markedly longer than the others ; leaf-sheaths pubescent with rather stiff tuberculate-based deciduous hairs ; ligule densely fringed with hairs ; leaf-blade large, flabellately nerved, 5-9 cm. broad 8. *megaphylla*

Inflorescence lax, frequently more or less drooping, the lowermost branches the longest ; leaf-sheaths with a dense fringe of hairs towards the apex ; ligule densely fringed with hairs ; leaf-blade as above 9. *Chevalieri*

Spikelets about 4 mm. long ; lower valve shortly caudate-acuminate, longer than the upper floret ; branches of panicle much divided at the base ; leaves as in preceding two species 10. *caudata*

Annuals with slender culms and fairly narrow leaves ; panicles with very short lateral branches ; valve of upper floret finely transversely rugose ; leaves often pilose with weak hairs ; glumes with distinct green nerves 11. *barbata*

1. *Setaria tenuispica* Stapf & Hubbard—F.T.A. 9 : 805 ; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 30. Slender, about 3 ft. high.
Sierra Leone : Messina, in very sandy soil (June) ! Batkanu, grasslands, swampy in rains (Jan.) ! Exsicc.—Fisher in Sierra Leone Herb. 2013. *Glanville* 123.
2. *S. anceps* Stapf—F.T.A. 9 : 793 ; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 29. A tall grass 3-6 ft. high, in tufts.
Gold Coast : Seeconde-Chama, grass typical of savannah forest (Apr.) ! Lagoons near Takoradi (Oct.) ! Togo : near Lome ! Extends to the Eastern Sudan and Portuguese Congo. Exsicc.—Chipp 185. *Howes* 983. *Warnecke* 318.
3. *S. sphacelata* Stapf & Hubbard ex M. B. Moss—F.T.A. 9 : 795 ; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 30. Widely distributed in open plains and savannah, from Senegal to N. and S. Nigeria, and in tropical Africa generally.
4. *S. laxispica* Stapf—F.T.A. 9 : 802. A slender grass about 2 ft. high ; bristles yellowish.
N. Nigeria : Lokoja distr. : Mt. Patti, 1,400 ft. (May) ! Exsicc.—Richardson.
5. *S. pallidifusca* Stapf & Hubbard—F.T.A. 9 : 815 ; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 31. A grass up to 3 ft. on dry open plains.
French Guinea : Timbo (Nov.) ! Gold Coast : Mt. Patti (Sept.) ! Nupe ! Abinsi (Sept.) ! Yola (July) ! Bauchi Plateau (July) ! S. Nigeria : Lagos ! Abo ! Also in the Cape Verde Islands, in tropical Africa generally, S. Africa, and Indo-Malaya to Queensland and Polynesia. Exsicc.—Pobiquin 1827. *Thonning*. *Vogel* 173. *Barter* 369 ; 1359 ; 1391. *Dalz.* 273 ; 868. *Lely* P. 417 ; P. 418 ; 756 ; 773. *MacGregor* 142.
6. *S. verticillata* Beauv.—F.T.A. 9 : 824.
French Sudan to N. and S. Nigeria ; widely spread in Africa, India and Malaya ; elsewhere as a weed. (See Appendix).
7. *S. longisetata* Beauv. Fl. Owar. 2 : 81, t. 110, fig. 2 ; F.T.A. 9 : 836 ; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 31. A tufted grass up to 5 ft. high, with erect or ascending culms, with lax panicles often tinged with purple.
French Guinea : Tinkisso ! Sierra Leone : Tower Hill (Dec.) ! Gold Coast : Kumasi (Mar.) ! Assuantsi Agric. Stn. (Feb.) ! N. Nigeria : Nupe ! S. Nigeria : various locs. ! Tropical Africa generally. Exsicc.—Pobiquin. *Vogel* 110. *Deighton* 539 ; 628 ; 800. *Thonning*. *Dalz.* 1321 ; 8422. *Barter* 915 ; 1357. *Müll.* 32. *MacGregor* 73. *Thomas* 508 ; 673 ; 1361.
8. *S. megaphylla* Dur. & Schinz—F.T.A. 9 : 840 ; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 32. A coarse perennial up to 12 ft. high ; leaves pleated fan-wise on opening.
Marshy and moist places from Gambia to Nizeria and Fernando Po, and in other parts of tropical Africa.
9. *S. Chevalieri* Stapf—F.T.A. 9 : 842 ; Chev. Rev. Bot. Appl. Agric. Trop. 1934 : 32. Like the preceding, averaging about 6 ft. high.



FIG. 367.—*SETARIA PALLIDIFUSCA*
Stapf & C. E. Hubbard (GRAMINEAE-
 PANICEAE).

A, glume. B, spikelet with bristles showing sides of lower and upper glumes and lower and upper lemmas. C, D, lemma of upper floret from front and back.



FIG. 368.—*SETARIA VERTICILLATA* P.
Beauv.

A, spikelets with bristles. B, spikelet showing lower glume and lower lemma. C, spikelet showing upper glume. D, upper floret showing palea and margins of lemma.

- From Senegambia to Nigeria and Fernando Po, and widely spread in other parts of tropical Africa; "conspicuous feature of the open country" (Jeffreys, S. Nigeria).
10. *S. caudula* Stapf—F.T.A. 9: 845. A tufted perennial 4-6 ft.; culms erect, up to 6 ft.
S. Nigeria: Bamenda, 5,500 ft. (Jan.)! Cameroons Mt.: Buea, 3,000 ft. (Jan.)! Also in East Africa. Exsicc.—Maitland 107; 337. Mann 2102. Migeod 396.
11. *S. barbata* Kunth—F.T.A. 9: 854; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 32. An annual up to 6 ft. high.
From Senegal to Nigeria and Fernando Po; also in Cape Verde Islands, the Shari, and west tropical Africa south to Angola; introduced into other parts of the tropics generally.

73. ACROCERAS Stapf—F.T.A. 9: 621.

Leaf-blades rather broadly lanceolate, about 6 times as long as broad, rounded and contracted at the base, acutely pointed, 6-12 cm. long, 1.5-2 cm. broad, with about 5 prominent nerves above on each side of the midrib, glabrous or thinly pubescent below, margins minutely scabrid; sheaths tight, densely ciliate; ligules very short, ciliate; panicles lax, slender, composed of 4-7 slender interrupted racemes; common axis smooth, angular; spikelets 4-5 mm. long, apiculate, pale green; lower glume $\frac{2}{3}$ the length of the spikelet, 3-nerved, middle nerve keeled upwards; upper glume 5-nerved, apiculate 1. *zizanioides*

Leaf-blades linear or narrowly linear-lanceolate, about 10-20 times as long as broad, rounded-subcordate at the base and amplexicaul, with numerous contiguous nerves on the upper side, glabrous except the minutely scabrid margins; sheaths densely ciliate upwards; spikelets similar to the above but more apiculate 2. *amplectens*

1. *A. zizanioides* Dandy in Journ. Bot. 1931: 54. *Acroceros oryzoides* Stapf—F.T.A. 9: 622; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 18. *Panicum oryzoides* Sw. not of Arduino. *P. zizanioides* H.B. & K. Perennial sometimes in pure stands in marshy ground, often slightly creeping.

Common in wet and shady places from French Guinea to Nigeria and in Fernando Po, and other parts of tropical Africa; widely distributed in the tropics. (See Appendix).

2. *A. amplectens* Stapf—F.T.A. 9: 625; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 18. *A. basicladum* Stapf. Perennial, in swamps, up to 3 ft., sometimes with runners.

French Sudan: Koulikoro, etc. French Guinea: Baffing (Oct.)! Senegal: Ziguinbar (Jan.)! Sierra Leone: Kambia (Dec.)! Makete (Oct.)! Gold Coast! S. Nigeria: Lagos! Jebba (Dec.)! Extends to the Southern Sudan and the Belgian Congo. Exsicc.—Chev. 2187; 2188; 24600. Lécarré 245. Pobéguin 1713. Deighton 803. Glanville 86. Beal 28. MacGregor 219. Hagerup 677. (See Appendix).

74. COMMELEINIDIUM Stapf—F.T.A. 9: 627.

Culms ascending from a prostrate base emitting long rigid roots from the nodes, many-noded; leaf-sheaths mostly shorter than the internodes, hirsute on the margins, the hairs much longer towards the top; ligules truncate, ciliate; leaf-blades obliquely ovate-elliptic, unequal-sided and constricted at the base, acutely and broadly acuminate, 5-7 cm. long, 2-2.5 cm. broad, with 4-5 principal nerves on each side below, closely and prominently nerved above, minutely pubescent below; panicle small, loose; spikelets 5-6 mm. long, glabrous; lower glume ovate, about half the length of the spikelet, 3-nerved, upper as long as the spikelet, 5-nerved *nervosum*

- C. nervosum* Stapf—F.T.A. 9: 629; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 19. Habit of certain *Commelinaceae*; in moist dense forest.

French Guinea: Kindia. Ivory Coast: Guideko, Middle Sassandra! near Assikasso (Dec.)! Also in Belgian Congo and Angola. Exsicc.—Chev. 16396; 22598.

75. ECHINOCHLOA Beauv.—F.T.A. 9: 604.

Lower glume acute to slightly cuspidate:

Spikelets very obtuse, scaberrulous towards the tips only; ligule a fine ciliate rim; nerves of glumes fading below the tips; branches of panicle erect, nearly their own length apart, about 2 cm. long; axis puberulous 1. *obtusiflora*

Spikelets acute to cuspidate or apiculate; ligule absent; nerves of the appressed pubescent glumes conspicuous; branches of panicle overlapping, about 1.5 cm. long; axis puberulous 2. *colona*

Lower glume cuspidate:

Ligule absent; spikelets very densely clustered in compound false spikelets leaving a pinnate skeleton of axes after their fall; panicle narrowly pyramidal; leaves up to 1.5 cm. broad, tapered to a fine point. 3. *Crus-Pavonis*

Ligule represented by a dense fringe of hairs (sometimes absent from the upper leaves): Spikelets acute or shortly cuspidate, always awnless, 3-4 mm. long, in large dense panicles; leaves up to 2 cm. broad, with scabrid or spinulose margins

4. *pyramidalis*
Spikelets acuminate, usually long-awned, 4-6 mm. long, awns up to 2 cm. long; false spikes more or less nodding, the panicle often secund; ligule a fringe of long stiff hairs or absent from the upper leaves; leaves up to 2 cm. broad, tapered to a fine point 5. *stagnina*

1. *Echinochloa obtusiflora* Stapf—F.T.A. 9: 606.
N. Nigeria: Kasa, common in northern Dikwa! Also in French Cameroons. Exsicc.—Guynn 118.
2. *E. colona* Link—F.T.A. 9: 607; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 892; Holl. 830. Annual in small tufts near water.
Senegal: near rivers! French Sudan: Gao! Koulikoro! French Guinea: Kouroussa (July)! Sierra Leone: Kambia! Gold Coast! N. Nigeria: Nupe! Widely spread throughout warmer regions. Exsicc.—Heudelot 534. Roger 52. Hagerup 356. Chev. 2177. Pobéguin 481. Deighton 848. Irvine 1101. Barter 1396. (See Appendix).



FIG. 369.—*ECHINOCHLOA COLONA* Link. (GRAMINEAE-PANICEAE).

A, spikelet, front view. B, same, side view. C, lemma of upper floret. D and E, grains, front and side view.

3. *E. Crus-Pavonis* Schult.—F.T.A. 9: 612; Chev. l.c. 1934: 17; Holl. 830. Near water up to 6 ft. high. Gold Coast: Kumasi (Oct.)! N. Nigeria: Naraguta (Aug.)! S. Nigeria: Lagos! Oban! Tropical Africa generally, Natal and tropical South America. Exsicc.—Howes 1000. Danodou 225. *Talb.* 850. *Lely* 447.
4. *E. pyramidalis Hitchc. & Chase*—F.T.A. 9: 615; Chev. l.c. 1934: 18; Holl. 830. Perennial reed-like up to 15 ft. high; rhizomes often floating. Throughout the area in or by water or in marshes, sometimes forming extensive meadows of inundation regions of the Niger and Lake Chad, etc., and throughout tropical Africa. Exsicc.—Lécard 125. *Heudelot* 443. *Chev.* 2173; 2179; 24605. *Pobéguin* 1735. *Sc. Elliot* 4260; 5061. *Deighton* 949; 1014; 1766. *Vogel* 31; 37. *Dalz.* 255; 482. *Barter* 1156. (See Appendix).
5. *E. stagnina* P. Beauv.—F.T.A. 9: 617; Chev. l.c. 1934: 17; Holl. 831. Perennial up to 6 ft. high, rooting at the lower nodes. Swamps, lakes and rivers, sometimes blocking up streams and waterways throughout the area and in tropical Africa generally. Exsicc.—Lécard 164; 244. *Heudelot* 306. *Chev.* 2170; 24757; 24970. *Hagerup* 527. *Barter* 843. *Dalz.* 250; 479. (See Appendix).

76. OPLISMENUS P. Beauv.—F.T.A. 9: 630.

Awns rigid and thread-like; perennial, creeping or straggling, often with long aerial roots from the nodes; leaf-sheaths densely ciliate; ligule short, truncate, ciliate; leaf-blades lanceolate to linear-lanceolate, constricted and rounded at the base, acutely acuminate, 2–12 cm. long, 1–1.8 cm. broad, shortly scabrid-pubescent; nerves numerous, close; inflorescence composed of a long slender axis bearing a few short spike-like racemes about their own length apart and 1–1.5 cm. long

Awns slender and hair-like; habit as above; leaf-sheaths softly ciliate; leaf-blades narrowly oblong-lanceolate, very acute, rounded at the base, 3–4 cm. long, about 8 mm. broad, thinly pilose; nerves numerous and close; inflorescence often somewhat second, slender; racemes much less robust than above, about 1.5 cm. long, long-pilose 1. *hirtellus*
.. .. . 2. *Burmanni*

1. *O. hirtellus* P. Beauv.—F.T.A. 9: 630; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 19; Holl. 832. Common in damp shady places from French Guinea to Nigeria; in the Cameroons Mt. up to 6,000 ft. Widely distributed in tropical and South Africa, Mascarenes, America and the Sandwich Islands. (See Appendix).
2. *O. Burmannii* P. Beauv.—F.T.A. 9: 636; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 19; Holl. 832. From Senegal, French Guinea, Sierra Leone, Nigeria and Fernando Po; also in the Cape Verde Islands and widely distributed throughout the tropics of both hemispheres. (See Appendix).

77. PASPALIDIUM Stapf—F.T.A. 9: 582.

Perennial, stoloniferous; culms ascending, stout, glabrous; leaf-sheaths loose; ligules a finely ciliate rim; leaf-blades broadly linear, up to 30 cm. long, closely nerved, pale green to glaucous; inflorescence slender, raceme-like; racemes suberect, spike-like, arranged on one side of the flattened common axis; pedicels reduced to short stumps with discoid tips; spikelets imbricate, 2.5 mm. long; glumes very dissimilar, the lower very short and truncate, upper elliptic, faintly nerved

geminatum

- P. geminatum* Stapf—F.T.A. 9: 583; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 891; Holl. 829. A grass of damp places, with broad conspicuous leaf-sheaths, and short racemes arranged on one side of a flattened common axis. French Sudan: Timbuctu (July)! Gold Coast: Cape Coast Castle (July)! N. Nigeria: Sokoto (June)! Bornu (Dec.)! Cape Verde Islands and tropical Africa generally. Exsicc.—Chev. 1221; 1230; 1231. *Vogel* 54. *Dalz.* 484. *Elliott* 160. (See Appendix).

78. UROCHLOA Beauv.—F.T. 9: A. 586.

Lower glume nearly as long as the spikelet, oblong, with inrolled margins, with a tuft of long hairs just above the middle, upper glume similar but finely pubescent; leaf-sheaths loose, usually pilose from a bulbous base; ligules reduced to a ciliate rim; leaf-blades linear-lanceolate from a broad rounded base, up to 15 cm. long and 2 cm. broad, ciliate, usually thinly pilose with bulbous-based hairs, with spaced nerves; inflorescence of 4–9 densely arranged racemes, the latter conspicuously hairy; spikelets imbricate, broadly ovate, about 4.5 mm. long 1. *trichopus*

Lower glume less than half as long as the spikelet, rounded-ovate, 3–5-nerved, glabrous, upper glume like the spikelet in shape and size; otherwise similar to the preceding but much less hairy, the spikelets less imbricate, and the axis of the racemes with scattered very long fine hairs 2. *lata*

1. *U. trichopus* Stapf—F.T.A. 9: 589; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 891. A leafy stemmed grass forming small tufts, up to 3 ft. high. French Sudan: Timbuctu Distr.; Taradji! Gao (Sept.)! Extends to the Red Sea districts south to Tanganyika Territory. Exsicc.—Chev. 2287; 2288. *Hagerup* 349. (See Appendix).
2. *U. lata* Hubbard, MS. *Panicum latum* Schum. *U. insculpta* Stapf—F.T.A. 9: 599; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 892; Holl. 829. French Guinea to North and South Nigeria, common in fields and cultivated places, extending through north tropical Africa to Arabia. (See Appendix).

79. STENOTAPHRUM Trin.—F.T.A. 9, 4: 578.

Perennial from a rhizome; culms ascending from the rhizome or from a prostrate rooting stem; leaf-sheaths much compressed and keeled; ligule a fringe of short

hairs; leaf-blades spreading at a wide angle from the sheath, broadly linear, obtuse or rounded at the apex, constricted and rounded at the base, 6–10 cm. long, 5–8 mm. broad, glaucous, glabrous, scabrid on the margin towards the apex, very closely nerved; false spikes 6–12 cm. long, flat on one side and about 6 mm. broad; racemes much reduced, with 1–3 spikelets sunk on one side in the hollows of the false spike; spikelets oblong-lanceolate, acute, about 5 mm. long; lower glume reduced to a short truncate scale; upper glume lanceolate, acute, glabrous *secundatum*

8. *secundatum* O. Kuntze—F.T.A. 9, 4: 579; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 891; Holl. 828.
S. glabrum Trin.—Chev. Bot. 737.
 Seashores from Sierra Leone to S. Nigeria, south to Angola and St. Thomas's and Princes Islands; also on the coasts of South Africa, America, the Pacific generally and Australia. Exsicc.—Deighton 465. Linder 1426. Chev. 20055. Chipp 274. Mann 529. Jeffreys 18. Maitland 25. (See Appendix).

80. PASPALUM Linn.—F.T.A. 9: 568. (See Appendix).

Spikelets ciliate from the margins of the upper glume, greenish-yellow, 1.5 mm. long, tightly appressed to the rachis of conjugate slender spike-like racemes, broadly elliptic; leaf-blades ciliate 1. *conjugatum*
 Spikelets not ciliate, quite glabrous or minutely pubescent:

Spikelets quite glabrous:

Spikelets ovate-oblong, rather flattened, up to 4 mm. long, in mostly conjugate spike-like racemes up to 4 cm. long; culms many-noded with the sheaths imbricate; blades linear, acute, up to 10 cm. long, spreading; ligule with fine hairs from behind 2. *vaginatum*

Spikelets broadly elliptic to suborbicular, conspicuously plano-convex:

Leaf-blades more or less rounded at the base, 15–20 cm. long, 8–18 mm. broad, finely scabrid on the margins; racemes 3–4 on a slender peduncle, up to 7 cm. long, with a broad flat rachis about 3 mm. wide; spikelets chestnut-brown; lower glume 0, upper as large as the spikelet 3. *auriculatum*
 Leaf-blades not or only very slightly constricted at the base:

Erect:

Racemes mostly 2 or 3, about 2.5–5 cm. long 4. *scrobiculatum* var. *Commersonii*
 Racemes 4–7 or more, 6–10 cm. long, often cinnamon-coloured when young

4. *scrobiculatum* var. *polystachyum*

Creeping and rooting at the nodes; leaf-blades broader, shorter and more obtuse than in var. *Commersonii*; rachis smooth; racemes 2, at most 5 cm. long

4. *scrobiculatum* var. *Deightonii*

Spikelets minutely pubescent, almost suborbicular, 1.5 mm. long, arranged in numerous slender fastigiate racemes, often dark-brown; leaf-sheaths and blades pilose

5. *paniculatum*

1. *Paspalum conjugatum* Berg.—F.T.A. 9: 569; A. Chev. Rev. Bot. Appl. Agric. Trop. 1934: 889; Holl. 824.
 Sierra Leone to S. Nigeria and Fernando Po, south to the Belgian Congo; common in America and the eastern tropics. Exsicc.—Thomas 296, etc. Glanville 57. Deighton 736; 1363; 2086. Johnson 469. Hones 907. Irvine 856. Linder 511. Datz 1314. Barber 1383. Mann 119.
2. *P. vaginatum* Sw.—F.T.A. 9: 570; A. Chev. l.c.; Holl. 827. Creeping, 1–2 ft. high, often near the beach. Senegal! Sierra Leone: Mambolo, creeping in tidal rice swamp (Jan.)! S. Nigeria: tidal flats near Lagos Island (Jan.)! Nun River! Fernando Po: on the beach! Also in St. Thomas and throughout the tropics, mostly on seashore; also in Spain. Exsicc.—Deighton 977; 1177. Barber, Vogel 60. Mann 441.
3. *P. auriculatum* Presl.—F.T.A. 9: 572; A. Chev. l.c. 890. Rooting at the lower nodes.
 Sierra Leone: Bumban (Sept.)! Kaballa (Sept.)! Jigaya (Sept.)! Liberia: Gbanga (Sept.)! Also in East Africa and in Java, Tonkin and the Philippines. Exsicc.—Thomas 1967; 2229; 2837. Linder 706.
4. *P. scrobiculatum* Linn. var. *Commersonii* Stapf—F.T.A. 9: 573; A. Chev. l.c.; Holl. 827.
 Wet places from Senegal to Nigeria and Fernando Po, and throughout the tropics of the Old World.
 Var. *polystachyum* Stapf—F.T.A. 9: 576; A. Chev. l.c.; Holl. 827.
 Throughout the area and in Eastern Sudan, Congo and E. Africa.
 Var. *Deightonii* C. E. Hubbard in Kew Bull. 1928: 40.
 Sierra Leone: Freetown, in shade of mango trees (Aug.)! Exsicc.—Deighton 777; 1774.
5. *P. paniculatum* Linn.—F.T.A. 9: 577; A. Chev. l.c.
 Sierra Leone: Tiko, Victoria, frequent (Feb.)! Cameroons Mt.: Buea, 3,000 ft., in shade (Jan.)! Also in French Cameroons, St. Thomas, Prince's Island, Gabon, and tropical America. Exsicc.—Maitland 352; 976.

81. BRACHIARIA Gris.—F.T.A. 9: 505. (See Appendix).

Lower glume $\frac{2}{3}$ or more than $\frac{2}{3}$ as long as the spikelet:

Rachis of racemes subtriquetrous, wavy, the back up to 1 mm. broad; lower glume as long as the spikelet, broadly elliptic, glabrous, often deep-purple on one side, 11-nerved; upper glume loosely pilose; spikelets contiguous, 5–6 mm. long; inflorescence of 3–6 secund arching racemes 4–5 cm. long; leaves linear-lanceolate, glabrous, minutely spinulose on the margin 1. *dictyonura*

Rachis of racemes herbaceous, more or less ribbon-like, with the setulously-ciliate margins curving over the bases of the spikelets placed right and left of a slender zig-zag midrib:

Spikelets hairy; perennials:

Leaf-blades narrowly convolute, with a keeled midrib, linear, tapered to a slender point, 7–22 cm. long, 2–3 mm. broad; inflorescence of 3–5 more or less curved dense secund spike-like racemes 2–3 cm. long, setose-ciliate along the angles; spikelets contiguous, about 3 mm. long 2. *falcifera*



FIG. 370.—*PASPALUM SCROBICULATUM* var. *COMMERSONII* Stapf.
(GRAMINEAE-PANICEAE).

A, ligule. B, portion of raceme, front view showing spikelets and stalks. B₁, B₂, flattened axis.
C, portion of raceme, back view. D, upper glume. E, lower lemma. F, upper lemma.
G, palea. H, grain.

Leaf-blades flat, broader, with a slender midrib :

Spikelets 3-3.5 mm. long, on a usually copiously and long-setulose ciliate rhachis 1.5-2 mm. wide ; racemes usually fulvous or rufous ; culms 3-4-noded ; blades up to over 30 cm. long, 4-8 mm. wide 3. *fulva*

Spikelets 2.5 mm. long on a more scantily and more shortly setulose-ciliate rhachis about 1 mm. wide ; racemes greenish ; culms 2-noded ; blades up to 18 cm. long and 5 mm. broad 4. *brevis*

Spikelets glabrous, conspicuously reticulate ; rhachis very narrow, with only a few scattered weak hairs ; inflorescence of 1 to 3 racemes up to 6 cm. long ; leaves rather short and broad, glabrous except the cartilaginous minutely toothed margins 5. *stigmatisata*

Lower glume at most half as long as the spikelet :

Rhachis more or less flat on the back, herbaceous :

Spikelets at most 3 mm. long :

Perennial ; racemes several, mostly borne singly ; rhachis glabrous except the angles ; spikelets 3-3.5 mm. long, glabrous, ovate-elliptic ; lower glume faintly 3-5-nerved, upper 5-7-nerved, often tinged with purple ; leaf-blades tapered from a broad base, about 1 cm. broad 6. *mutica*

Annual, often rooting at the lower nodes ; racemes 2-4, slender, 3-5 cm. long ; spikelets rather distantly 1-seriate, elliptic, subacute, 3-3.5 mm. long, pale green ; lower glume 5-7-nerved, upper usually 5-nerved ; leaves narrowly linear, at most 4 mm. broad 7. *distachyoides*

Spikelets 5 mm. long, sub-1-seriate, mucronate ; lower glume surrounding the base of the spikelet, hyaline ; perennial, rooting at lower nodes ; leaves broadly linear-lanceolate, acute, 8-16 cm. long, 0.8-1 cm. broad ; ligule a fringe of short hairs 8. *plantaginea*

Rhachis more or less triquetrous on the back, sometimes filiform :

Spikelets 3-7 mm. long, mostly turgid :

Spikelets subsessile, their pedicels rarely exceeding 1 mm. long :

Spikelets glabrous or nearly so :

Racemes long and markedly secund, 6-12 cm. long ; spikelets 4-7 mm. long ; perennial coarse grass, more or less softly villous on the leaf-sheaths and blades ; lower glume 7-11-nerved, upper 7-9-nerved 9. *brizantha*

Racemes shorter than above :

Rhachis very shortly puberulous, subtriquetrous ; leaf-sheaths glabrous or nearly so ; blades 5 mm. broad, glabrous ; racemes 2-4, 1-3 cm. long ; spikelets 2-seriate, contiguous ; lower glume 5-nerved, upper 5-nerved, scaberulous on the nerves 10. *stipitata*

Rhachis and pedicels with long setose hairs ; leaf-sheaths softly hairy at the top ; blades very finely pubescent, 8-15 cm. long, 8-10 mm. broad ; panicles narrow, 10-15 cm. long ; spikelets mostly in pairs, glabrous, 3.5 mm. long 11. *Hagerupii*

Spikelets more or less silky-villous or with a silky transverse subapical fringe ; leaf-sheaths and blades long-pilose all over ; racemes very short, in slender inflorescences ; lower glume 3-nerved, upper 5-nerved 12. *brachylopha*

Spikelets (at least those near the base of the raceme) normally 2-nate, with the primary on an elongated pedicel ; lower floret barren ; annuals :

Spikelets more or less rostrate-acuminate or cuspidate, about 4 mm. long, more or less pubescent, greenish, contiguous to subimbricate ; lower glume 7-nerved, upper 5-nerved ; whole plant softly villous 13. *xantholeuca*

Spikelets obtuse or subacute or minutely apiculate, about 3 mm. long ; leaves markedly rounded at the base :

Spikelets or pairs or clusters (secondary racemes) of spikelets approximate, evenly distant by less than their own length, glabrous or hairy ; primary pedicels not more than 2 mm. long ; lower glume usually 5-7-nerved, upper usually 7-nerved, nerves green 14. *ramosa*

Spikelets or pairs of spikelets or secondary racemes very loosely scattered, distant by 10-16 mm., glabrous or hairy ; primary pedicels 6-10 mm. or more long ; lower glume 5-nerved, upper 7-nerved 15. *deflexa*

Spikelets up to 3 mm. long, somewhat flattened :

Spikelets solitary and subsessile or the lower paired, not gaping ; lower florets barren ; panicle shortly hairy 16. *distichophylla*

Spikelets mostly in short racemules or clusters of 6-2, frequently gaping ; lower floret male ; panicle with long fine hairs 17. *Kotschyana*

1. *Brachiaria dictyoneura* Stapf.—F.T.A. 9 : 512. Erect up to 3 ft. high.

N. Nigeria : Naraguta, on plains (July) ! Widely distributed in East Africa from the Sudan to Portuguese East Africa. Exsicc.—Lely P. 405.

2. *B. falcatra* Stapf.—F.T.A. 9 : 517. *Panicum collare* Schum.

French Guinea : Kouroussa (Apr.) ! Gold Coast : Tamale ! Christianborg (Mar.-Apr.) ! Achimota (Aug.) ! Exsicc.—Pobéquin 699. Williams 2. Irvine 869 ; 1428. Johnson 1021 ; 1035. Thonning 373 (tracing).

3. *B. fulva* Stapf—F.T.A. 9: 518; Holl. 822.
Gambia! French Guinea: Kouroussa. Dahomey! N. Nigeria: Nupe! Abinsi! Katagum! Bauchi Plateau (Apr.)! Zaria! Vodni! Naraguta (June)! S. Nigeria: Ogboro Road (May)! Also in French Cameroons, East Africa and Angola. Exsicc.—Skues. Chev. 23677. Barter 1384. Dalz. 256; 896. Lely 289; P. 243. Taylor 18. Saunders 58. Dawodu 34.
4. *B. brevis* Stapf—F.T.A. 9: 519.
French Guinea: Futa Jallon; Diaguissa, 4,250–4,600 ft. Gold Coast: Zuarungu (June)! Afram Plains (Mar.)! Salaga (May)! Tamale (Oct.)! Exsicc.—Williams 383; 510. Johnson 724. Krause. Irvine 253. Howes 1139. Beale 27.
5. *B. stigmatifera* Stapf—F.T.A. 9: 520.
Gambia. French Guinea: Timbo (Aug.)! Futa Jallon. N. Nigeria: Jeba. Also in Eastern Sudan. Exsicc.—Pobéguin 1711. Barter.
6. *B. mutica* Stapf—F.T.A. 9: 526; Holl. 822. Perennial 3–6 ft. or more high, with densely tomentose nodes.
Senegal and French Sudan to Cameroons, and South to Angola, and in East Africa, also S. America. Exsicc.—Chev. 2294; 26019. Hagerup 415. Vogel 32. Johnson 1036. Dalz. 481. Mailland 10; 69; 105. Barter 1045.
7. *B. distachyoides* Stapf—F.T.A. 9: 530. Annual, pale green-glaucous, glabrous; culms rooting at lower nodes.
S. Nigeria: Lagos! Exsicc.—Dawodu 163.
8. *B. plantaginea* Hitchcock in Contrib. U.S. Nat. Herb. 12: 212 (1909). *Panicum plantagineum* Link.
Cameroons Mt.: Bues, 3,000 ft. (Dec. and July)! Also in tropical America. Exsicc.—Mailland 26; 860.
9. *B. brizantha* Stapf—F.T.A. 9: 531. Erect perennial up to 6 ft.
Sierra Leone: Yenkisa, 400 ft.! N. Nigeria: Vodni! Naraguta, near water (July)! S. Nigeria: Ila (Oct.)! Through the Cameroons and Ubangui district to East Africa. Exsicc.—Glanville 310. Saunders 27. Lely P. 422. Thomas 1930.
10. *B. stipitata* C. E. Hubbard in Kew Bull. 1933: 498. Annual up to 15 in. high.
French Guinea: Between Mamou and Dalaba (Nov.)! Exsicc.—Chev. 34598.
11. *B. Hagerupii* Hitchcock in Journ. Wash. Acad. Sci. 1929: 303 (1929).
French Sudan: Timbuktu (Aug.)! Between Oualata and Heissa! Exsicc.—Hagerup 271. Jumelle 5.
12. *B. brachylopha* Stapf—F.T.A. 9: 539. Densely pilose, up to 3 ft., with very short racemes.
French Sudan: Ouassana (Mar.)! Ivory Coast: Dabou! Mbrabo (Jan.)! Gold Coast: Kurugu (July)! Bole! N. Nigeria: Nupe! Ikoja (May)! Exsicc.—Chev. 17148. Vigne 3829. Williams 527. Barter 1397.
13. *B. xantholeuca* Stapf—F.T.A. 9: 541. Common in fields, softly pubescent, annual.
French Sudan: Yatenga (Aug.)! N. Nigeria: Mongonu (Oct.)! Nupe! Sokoto (Aug.)! Also in Bagirmi, Rhodesia and S.W. Africa. Exsicc.—Chev. 24880. Golding 8. Barter 799; 1366. Dalz. 476; 476a.
14. *B. ramosa* Stapf—F.T.A. 9: 542.
Senegal: Richard Toll! French Sudan: Diré to Bandiagara (May)! N. Nigeria: Kalkala, near Lake Chad! Also in Cape Verde Islands. Exsicc.—Rogér 34. Leprieux. Rogeon-Feclercq 268. Golding 78.
15. *B. deflexa* C. E. Hubbard, MS. *B. regularis* Stapf—F.T.A. 9: 544. *Panicum deflexum* Schum.
French Sudan: El Oualadij (Mar.)! Sompi (Aug.)! Mossi (Aug.)! Timbuktu (Aug.)! Gold Coast: Aburi Gardens (Aug.)! Achimota (May)! Bomase (Mar.)! Accra (July)! N. Nigeria: Nupe! S. Nigeria: Ibadan (Mar.)! Tropical Africa generally, Yemen, N.E. Transvaal, and Madagascar. Exsicc.—Chev. 2282; 24752; 43915. Hagerup 259. Schumacher (tracing). Brown 327. Johnson 1004. Irvine 1633. Dalz. 167; 1424. Deighton 591. Barter 1367B. Dawodu 70.
16. *B. distichophylla* Stapf—F.T.A. 9: 557; Holl. 821. Annual up to 1½ ft. high.
French Guinea and Senegal to N. and S. Nigeria, extending to Angola. Exsicc. (additional to those quoted in F.T.A.)—Hagerup 484.
17. *B. Kotschyana* Stapf—F.T.A. 9: 559. Annual over 2 ft. high.
N. Nigeria: Yola (July)! S. Nigeria: Aguku district! Tropical Africa generally. Exsicc.—Dalz. 275. Thomas 1079; 1390.

82. AXONOPUS P. Beauv.—F.T.A. 9: 565.

Perennial, up to 0.75 m. high, from a slender rhizome or runners; culms erect or ascending; leaf-sheaths crowded; ligule a minutely ciliate rim; blades elongate-linear-lanceolate, up to 12 cm. long and 1 cm. broad, with about 5 main nerves on each side of the midrib, glabrous or (especially the lower) rigidly ciliate; inflorescence of 2 digitate or a few racemously arranged slender spikes up to 15 cm. long; rachis 3-angled; spikelets subsessile, pale green, oblong-lanceolate, broadly acuminate, about 4 mm. long; glume 4–5-nerved, with lines of fine hairs between the nerves

compressus

- A. compressus* P. Beauv.—F.T.A. 9: 566; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 889; Holl. 823.
French Guinea to S. Nigeria, fairly common; widely spread in warmer regions. Exsicc.—Pobéguin 1703. Deighton 624; 734; 750; 1364; 2030; 2075. Thomas 1599. Chev. 19762; 34899. Dalz. 1313; 1422. Mailland 17; 161. Barter 1842. (See Appendix).

83. ERIOCHLOA H.B. & K.—F.T.A. 9: 497.

Tufted annual; culms erect or ascending; leaf-sheaths loose, closely nerved; ligules represented by a line of hairs; leaf-blades linear, up to 15 cm. long, 3–4 mm. broad, glabrous or slightly hairy; panicle raceme-like, slender, of few loosely arranged racemes; racemes about 3 cm. long; rachis flat on one side, with minutely scabrid margins; pedicels shortly pubescent, tips swollen and subdisoid; spikelets oblong-lanceolate, sharply acuminate, more or less appressed-pilose; lower glume reduced to a rim; upper silky; lower floret reduced to a mucronulate valve *acrotricha*

- E. acrotricha* Hack. ex Thell.—F.T.A. 9: 3: 499; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 884.
Senegal: Dakar (Jan.)! Richard Tol (Sept.)! Widely spread in tropical Africa and through Arabia to India. Exsicc.—Rogér 17. Chev. 2289. (See Appendix).

84. CHLOACHNE Stapf in Hook. Ic. Pl. t. 3072.—F.T.A. 9: 489.

Culms ascending, sometimes with long flagelliform aerial roots from the many nodes; leaf-sheaths open, densely ciliate; ligule 1 mm. long; blades lanceolate, acutely

acuminate, unequal-sided at the base, 9–13 cm. long, 1.5–2 cm. broad, thinly pubescent on both sides, with 3–4 nerves on each side and less prominent ones between; panicle long-exserted; racemes distant, up to 4 cm. long; rhachis angular; spikelets secund, about 7 mm. long; glumes pale green, setose-hirsute, 5-nerved, the lower slightly shorter than the upper *optismenoides*

- C. *optismenoides* Stapf, MS. *Panicum optismenoides* Hack. *Poecilostachys flaccidula* Stapf ex Rendle. C. *secunda* Stapf l.c.—F.T.A. 9, 3: 489.
Cameroons Mt.: 3,000–7,800 ft. (Dec.–Feb.)! Also in South Tanganyika and Nyasaland. Exsicc.—Mann 1354; 2101. *Mailland* 340; 1031. *Steele* 93a. *Dunlap* 67.

85. PSEUDECHINOLAENA Stapf—F.T.A. 9: 494.

Culms slender, rooting at the lower nodes; leaf-sheaths tight, ribbed, usually glabrous except the margin; ligules thin, ciliate; leaf-blades lanceolate or oblong-lanceolate, acutely acuminate, often obliquely rounded at the base, 1.5–5 cm. long, thinly pilose on both surfaces; inflorescence a slender lax raceme-like panicle on a slender peduncle; spikelets obliquely and narrowly ovoid, gaping, mostly solitary and secund; glumes greenish; lower glume shorter than the spikelet, ovate-oblong, glabrous, with distinct nerves; upper glume oblong-elliptic, more or less armed with hooked bristles, but these very variable in the same raceme *polystachya*

- P. *polystachya* Stapf—F.T.A. 9, 3: 495; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 884. A slender forest grass in damp shady places, sometimes forming a carpet; upper glumes armed with hooks.
French Guinea: Futa Jallon, 3,600–4,000 ft. Sierra Leone: Kenema (Nov.)! Potoru, common (Apr.)! Liberia: Gbanga (Sept.)! Gold Coast: Aburi (Sept.)! S. Nigeria: Aboh! Oban! Cameroons Mt.: Buea, 3,000–4,000 ft. (Jan.)! Through the Ubangui-Shari to Uganda, the Belgian Congo and Angola to Gazaland; occurs also in forests at St. Johns, S.E. Africa. Exsicc.—Chev. 18570. *Deighton* 416; 1662. *Linder* 705. *Johnson* 832. *Irvine* 64. *Barter* 1354. *Talb.* 851. *Mailland* 147; 339. *Dunlap* 59.

86. ACRITOCHEAETE Pilger—F.T.A. 9: 481.

Perennial; culms very slender, weak, many-noded; leaf-sheaths loose, closely ribbed, glabrous except near the top; ligule conspicuous, submembranous; blades narrowly lanceolate, setaceously acuminate, shortly “petiolate” at the base, about 8 cm. long and 8 mm. broad, thinly pilose on both surfaces, margins slightly thickened and wavy; peduncles very slender; inflorescence narrowly racemose, the spikelets subsecund, green, about 6 mm. long with fine long entangled awns from the upper glume and lower lemma; lower glume truncate, nerveless, about 1 mm. *Volkensii*

- A. *Volkensii* Pilger—F.T.A. 9: 481. Culms weak, trailing, rooting at the lower nodes, up to 3 ft. long.
Cameroons Mt.: Mokanda, 6,000 ft., in open part of forest (Feb.)! Mts. of Uganda, Kenya and Tanganyika at 7,000–8,000 ft. Exsicc.—*Mailland* 1339.

87. ALLOTEROPSIS Presl—F.T.A. 9: 482.

Leaves linear, narrow at the base, pubescent; sheaths tight, the lower ones appressed-silky, the upper ones thinly pubescent; ligule a ciliate rim; racemes digitate, 2–5 together, 5–12 cm. long; rhachis wavy, angular, shortly pilose; spikelets usually 2-nate; pedicels unequal, one very short; lower glume ovate, acuminate, 2.5 mm. long, 3-nerved, glabrous, upper shaped like the spikelet, 5 mm. long, densely ciliate, 5-nerved; lemma of lower floret as long as the spikelet, often mottled with brown, glabrous; lemma of upper floret similar, but produced into a short bristle 3 mm. long, minutely ciliate 1. *semilata*

Leaves oblong-lanceolate, rounded-cordate at the base, acute, 5–12 cm. long, 1–2 cm. broad, very closely nerved, with crisped-wavy margins and sometimes pectinate-ciliate towards the base; leaf-sheaths at length loose, glabrous to sparingly hispid; ligule very short, densely ciliate; inflorescence a cluster of racemes, but the middle one racemously branched; racemes or branches up to about 15 cm. long, slender; spikelets rather laxly arranged; lower glume 1-nerved; upper glume the shape of the spikelet, very shortly ciliate, 5-nerved; lemma of upper floret produced into an awn 4–6 mm. long 2. *paniculata*

1. A. *semilata* Hitchcock—F.T.A. 9, 3: 483; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 883.
French Guinea: Timbo! Between Mamou and Kindia Rivers! Dahomey: Atacora Mts.; Tomba country, 1,200–1,800 ft. (June)! N. Nigeria: top of Zaramda Mt., 5,800 ft. (May)! Bauchi Plateau (Apr.)! Also in Abyssinia, East Africa and Angola, and the Eastern tropics; the var. *Ecklonii* in the Congo, Nyasaland, Rhodesia and South Africa. Exsicc.—*Pobéquin* 1535. *Chev.* 13580; 24183. *Lely* 195; P. 242.
E. A. *paniculata* Stapf—F.T.A. 9, 3: 486; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 883. Tufted 1–2 ft. or 2–3 ft. in wetter places; stems often purplish; often in rice swamps.
French Sudan: San, Bani River (June)! Sierra Leone: Mano! Kambia (Dec.)! Pujehun (Apr.)! N. Nigeria: Lokoja! S. Nigeria: Onitsha! Through the Shari and Congo to Portuguese East Africa and in Mauritius. Exsicc.—Chev. 1092. *Thomas* 10646. *Deighton* 693; 845; 1655. *Ansell.* *Barter* 1756. (See Appendix).

88. DIGITARIA Hall.—F.T.A. 9: 422. (See Appendix).

Spikelets mostly hairy, not accompanied by white setulae from the tips of the pedicels; barren valve 7–5-nerved:

Rhachis of racemes trigonous, laterally winged or margined:

Upper glume 3-nerved, rather different in shape and size from the barren valve:

Hairs fine to very fine, smooth-walled, with straight tips:

Lower glume distinct, an ovate membranous scale, persistent; **annuals** :

Racemes in a succession of 6 or more whorls on a slender common axis, loosely plumose at the base, up to 5 cm. long, very slender; spikelets contiguous to the rhachis, oblong, acute, 1.5 mm. long, greenish to pale straw colour; leaf-blades lanceolate from a broad subcordate base, up to 10 cm. long and 1.5 cm. broad, thin and flaccid 1. *Perrottetii*

Racemes digitately arranged or in up to about 3 whorls only, not plumose at the base :

Spikelets acute or acuminate, with smooth nerves :

Spikelets 1.5-2 mm. long; rhachis frequently with some long spreading very fine glistening hairs, scabrid; racemes up to 15 cm. long; leaf-blades linear-lanceolate, equally wide and rounded at the base, up to 12 cm. long, flaccid 2. *velutina*

Spikelets 2-3 mm. long; rhachis without long hairs; leaf-blades with cartilaginous margins 3. *adscendens*

Spikelets with a very acute often curved acumen and rough nerves, 2-3 mm. long; racemes 15-20 cm. long, stiff; leaf-blades linear from an equally wide base, glabrous or with a few long stiff hairs near the base, up to 20 cm. long and 6 mm. broad 4. *acuminatissima*

Lower glume a very minute cuff-like scale at the base of the spikelet, early breaking up and disappearing :

Indumentum of spikelets short, appressed and often scanty or obscure, pale tawny; perennial; spikelets up to 2 mm. long, 2-6-nate, dense, upper glume about half as long as the fertile floret; racemes up to 25 cm. long; rhachis flattened and winged upwards; ligules ciliolate; leaf-blades long-tapered to a fine point, glabrous 5. *seminuda*

Indumentum of spikelets longer, appressed, produced beyond the tips of the spikelets into a short or long pointed tuft; **annuals** :

Spikelets 3-3.5 mm. long, with a copious silvery or purplish lateral fringe of hairs; leaf-sheaths and blades pilose with tubercle-based hairs, blades tapered to a fine point; ligule ciliolate 6. *Gayana*

Spikelets 2-2.5 mm. long, with a shorter fringe of hairs, ultimately bronze colour to rufous and spreading; racemes up to 15 cm. long; leaf-blades tapered to a fine point, narrowly linear 7. *Lecardii*

Hairs, if any, very short with obtuse clavate tips, or somewhat long with very acute clavate tips, appressed, forming a delicately furfuraceous indumentum; pedicels angular and scabrid with usually hispidulous tips; **annuals** :

Spikelets hairy; fertile floret early darkening and sharply contrasting with the rest of the spikelet :

Hairs of the spikelet very short, obtusely clavate; barren lemma 3-nerved; pedicels with distinctly hispidulous or minutely bearded tips; rhachis of racemes 0.5-1 mm. wide; spikelets 2 mm. long; leaf-blades linear-lanceolate, tapered from a broadish base to the acute apex, sometimes with fine spreading hairs near the base 8. *ternata*

Hairs of spikelets elongated, with very acute clavate tips; barren lemma 7-nerved; pedicels with scabrid or scaberulous tips; racemes 2-3 or rarely 4, 6-9 cm. long; leaf-blades narrowly linear, tapered to a fine point, about 3 mm. broad, pilose 9. *delicatula*

Spikelets glabrous, elliptic-lanceolate, acute, 2 mm. long; barren valve 7-nerved; fertile floret darkening late; racemes 4-10, digitate, the lowest usually below the others, nearly 15 cm. long, pale green; leaf-blades broadly linear, tapered from near the base, up to 30 cm. long and 1 cm. broad, with long hairs at the base 10. *Iburea*

Upper glume 5-nerved, as long as and generally similar to the barren valve, the latter 7-nerved; hairs, if any, extremely fine, equally wide throughout, smooth-walled with curled tips :

Perennial; culms many-noded; leaves more or less villous; racemes racemose, very slender, about 6-10, about 10 cm. long, pale green; spikelets scarcely imbricate, oblong, subacute, 1.5 mm. long 11. *Chevalieri*

Annual :

Spikelets oblong to lanceolate-oblong, acute, up to 2 mm. long :

Nodes bearded; spikelets 2 mm. long, whitish with silvery lines of very short hairs; racemes 8-15, very slender, the lowest usually bare at the base; leaves linear, glabrous or with a few hairs near the base 12. *leptorrhachis*

Nodes glabrous; spikelets not quite 2 mm. long, greenish or brownish, acute, glabrous; racemes 6-15, sessile, very slender, 8-15 cm. long; leaves linear, glabrous 13. *nigritiana*

Spikelets lanceolate, finely or almost caudate-acuminate from the upper glume, 2-3 mm. long, glabrous; lower leaf-sheaths softly pilose; racemes shortly racemose 14. *debilis*

Rhachis of racemes usually flat, with a rounded smooth midrib on the face; upper glume as long as the spikelet, 5-3-nerved; hairs of spikelets, if any, conspicuously verrucose, very fine; annuals:

Spikelets subacute to acuminate, but not aristulate:

Spikelets shortly hairy, elliptic-oblong, subacute to acute, less than 2 mm. long; culms prostrate and rooting towards the base; leaves lanceolate to linear, comparatively short, up to 8 cm. long, glabrous or nearly so; racemes 2-3, up to 7 cm. long. 15. *longiflora*

Spikelets glabrous, elliptic-oblong, acute, about 2 mm. long, pale green; leaves linear, acute, up to 15 cm. long, glabrous; racemes 2-4, sessile, digitate, very slender, up to 12 cm. long. 16. *exilis*

Spikelets aristulate from the fertile floret, oblong-lanceolate, up to 2 mm. long, glabrous; lower glume suppressed or a faint hyaline rim; culms short and leafy; leaves very small and short, linear-lanceolate, up to 2.5 cm. long, softly and loosely hairy; racemes 3-5, sessile, to 5 cm. long. 17. *aristulata*

Spikelets quite glabrous, accompanied by white setulae of equal or greater length from the tips of the pedicels; lower glume normally suppressed, upper reduced to a small scale or suppressed; barren valve 3-1-nerved:

Perennial, with very long internodes, bearded at the nodes; racemes numerous, collected into an oblong panicle and up to 23 cm. long; spikelets oblong-elliptic, subacute, nearly 2 mm. long, greyish or brownish on the flat, chestnut to black-brown on the convex side. 18. *uniglumis* var. *major*

Annual, with glabrous nodes; racemes forming a short panicle, up to 12 cm. long; spikelets ovate to oblong-elliptic, subacute, 1 mm. long, grey on the flat, chestnut-brown or very dark on the convex side. 19. *minutiflora*

1. *Digitaria Perrottetii* Stapf—F.T.A. 9: 435; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 879. Senegal! Also in south tropical Africa. Exsicc.—Heudelot 448. Huard. Roger.
2. *Velutina* P. Beauv. Agrost. 51. *Phalaris velutina* Forsk. *D. horizontalis* Willd.—F.T.A. 9: 436; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 879; Holl. 820. Widely distributed from the Cape Verde Islands and Senegal to Nigeria, Fernando Po, tropical Africa generally, Natal, Mascarenes and tropical America.
3. *D. ascendens* Heward in Blumea 1: 92. *Panicum ascendens* H.B. & K. *D. marginata* Link.—F.T.A. 9: 439; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 879. Annual up to 23 ft. French Sudan: Macina (Sept.)! Timbuktu (July)! Gambia! Sierra Leone: Freetown! Gold Coast: Accra! N. Nigeria: Naraguta (July)! Cameroons Mt.: Buea (July)! Tropical Africa generally, and in the tropics of both hemispheres. Exsicc.—Hagerup 207; 515. Chev. 24884. Hayes 558. Deighton 272, etc. Dalz. 169. Lely P. 402. Maitland 2.
4. *D. acuminatissima* Stapf—F.T.A. 9: 441; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 880; Holl. 818. Annual, culms stout. French Sudan: between Goudam and Faginiberg (Aug.)! San (Sept.)! N. Nigeria: Abinsi, common weed (May)! Also in Angola. Exsicc.—Chev. 2218; 2284. Dalz. 907.
5. *D. seminuda* Stapf—F.T.A. 9: 446; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 880. Erect stiff perennial over 3 ft. high. Sierra Leone: Mabum (Aug.)! Njala (July)! French Guinea: Kourila! S. Nigeria: Opobo! Exsicc.—Caille in Herb. Chev. 15020. Thomas 1516. Jeffreys 24. Deighton 733.
6. *D. Gayana* Stapf ex A. Chev.—F.T.A. 9: 449; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 36; Holl. 819. Annual up to 4 ft. with silky pale mauve spikelets. Senegal! Gold Coast! N. and S. Nigeria! Extends to Eastern Sudan and Belgian Congo. Exsicc.—Heudelot 446. Roger 56. Beal 6; 48. Vogel 163. Hagerup 482. Barter 718. Dalz. 501; 1128.
7. *D. Lecardii* Stapf—F.T.A. 9: 450; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 36; Holl. 821. Up to 4 ft. high. French Sudan: Segou! N. Nigeria: Zaria (July)! Yola, very common in bush (Sept.)! Nupe!
8. *D. ternata* Stapf—F.T.A. 9: 452; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 881. Annual up to 2 ft. high. French Guinea: Timbo! S. Nigeria: Yaba, near Lagos (June)! Tropical Africa generally and in E. South Africa and eastern tropics. Exsicc.—Pobéguin. Dalz. 1425.
9. *D. delicatula* Stapf—F.T.A. 9: 454; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 881. Ivory Coast: Adiokrou country! Gold Coast: S. Nigeria: Lagos, near water! Exsicc.—Chev. 17149. Dawodu 210.
10. *D. thurua* Stapf—F.T.A. 9: 455; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 881; Holl. 820. Annual about 2 ft. high. N. Nigeria: Zaria, cultivated as field crop (Sept.)! Exsicc.—Lamb 54.
11. *D. Chevalieri* Stapf—F.T.A. 9: 458; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 881. Perennial, with silky leaf-sheaths, culms rooting at the lower nodes. French Sudan: Dendela. Ivory Coast: Bingerville (Dec.)! S. Nigeria: Lagos Island (June)! N. Nigeria: Lokoja (June)! Naraguta (July)! Exsicc.—Chev. 629; 16003. Dalz. 1233; 1426. Dawodu 157. Lely P. 407. Maitland 165.
12. *D. leptorrhachis* Stapf—F.T.A. 9: 462; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 882. Annual up to 2 ft. high. French Sudan: Segou! Exsicc.—Lécard 252.
13. *D. nigritiana* Stapf—F.T.A. 9: 463. S. Nigeria: Brass River! Exsicc.—Barter.
14. *D. debilis* Willd.—F.T.A. 9: 464; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 882; Holl. 818. Annual, culms rooting at the base, up to 2 ft. high. French Sudan: San (June)! between Gourma and Mossi (July)! Sierra Leone: Makump (May)! N. Nigeria: Sokoto (July)! Katagum! Abinsi (May)! S. Nigeria: Lagos! Bamenda, 5,500 ft. (Jan.)! Tropical Africa generally, and in Mediterranean countries. Exsicc.—Chev. 1095; 24547. Deighton 1717. Dalz. 254; 496; 879. Migeod 406.
15. *D. longiflora* Pers.—F.T.A. 9: 469; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 882; Holl. 821. Creeping annual, rooting at the nodes. Gambia, grown throughout! French Guinea: Timbo (Oct.-Nov.)! Sierra Leone: various localities! S. Nigeria: Lagos! Opobo! Tropical Africa generally, S. Africa, Madagascar, and eastern tropics. Exsicc.—Pirie. Pobéguin 1702 bis; 1706; 1823. Deighton 130; 1001; 1362; 1589; 2014. Dawodu 39. Dalz. 1427. Jeffreys 5; 26.

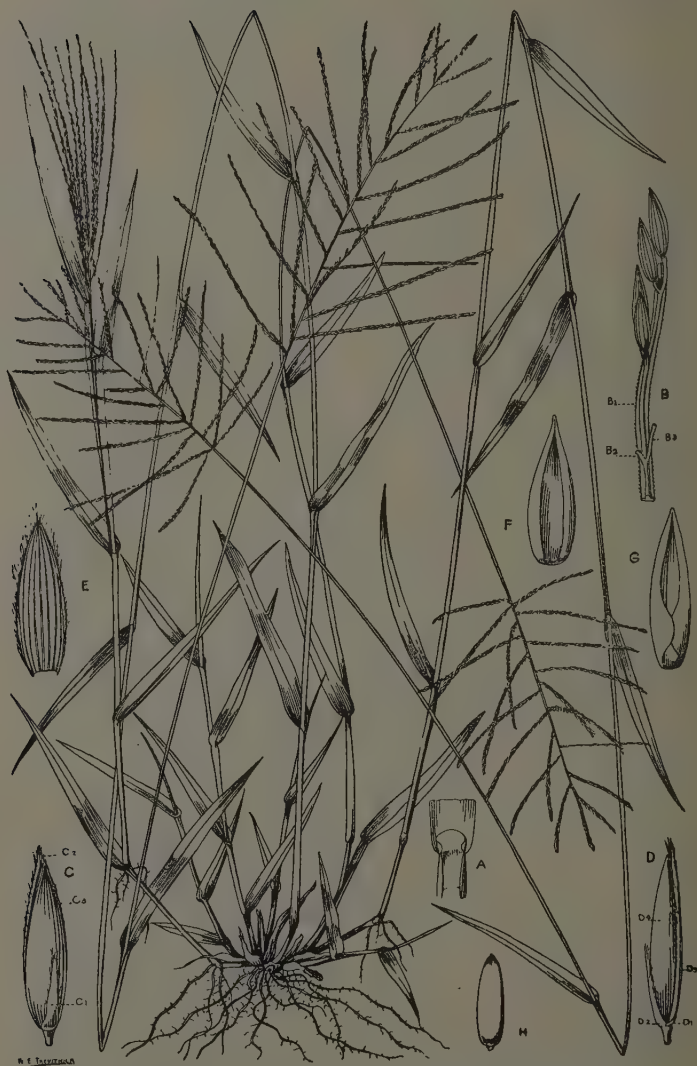


FIG. 371.—*DIGITARIA VELUTINA* Beauv. (GRAMINEAE-PANICEAE).

A, ligule. B, portion of raceme. B₁, axis of raceme. B₂ and B₃, stalks of spikelets. C, spikelet, front view. C₁, upper glume. C₂, lower lemma. C₃, upper lemma. D, spikelet, side view. D₁, lower glume. D₂, upper glume. D₃, lower lemma. D₄, upper lemma. E, lower lemma. F, upper lemma. G, palea. H, grain.

16. *D. exilis* Stapf—F.T.A. 9: 470; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 882; Holl. 818. Annual up to $1\frac{1}{2}$ ft.
Sierra Leone to N. Nigeria, apparently confined to the area of this Flora.
17. *D. aristulata* Stapf—F.T.A. 9: 471; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 882.
Senegal! French Sudan: Djenne (June)! Also in the Congo. Exsicc.—Leprieux. Perrotet 907.
Chev. 1094; 1121.
18. *D. uniglumis* Stapf, var. *major* Stapf—F.T.A. 9: 476; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 883; Holl. 821.
S. Nigeria: Lagos! Extends to Angola and Nyasaland. Exsicc.—Dawodu 208.
19. *D. minutiflora* Stapf—F.T.A. 9: 476; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 883. Annual about 2 ft. high.
French Guinea: common near Timbo (Oct.)! Also in N.E. and E. tropical Africa and the Congo.
Exsicc.—Pobéguin 1701.

89. RHYNCHELYTRUM Nees—F.T.A. 9: 869.

Annual or short lived perennial; culms ascending from an often decumbent base and rooting at the lower nodes; nodes very softly and shortly pubescent; leaf-sheaths ribbed, glabrous or nearly so; ligule a densely ciliate rim; leaf-blades linear, acute, up to 30 cm. long; lateral nerves about 5 on each side of the midrib, with very close less conspicuous nerves between; panicle very silky, from silvery-white to cream-pink, or purplish; branches of the panicle capillary, the ultimate branchlets often with long fine hairs; spikelets silky-pilose; lower glume truncate or emarginate, upper as long as the spikelet (up to 6 mm.), mucronate or shortly awned, 5-nerved

repens

- R. repens* C. E. Hubbard in Kew Bull. 1934: 110. *Saccharum repens* Willd. *R. roseum* Stapf & Hubbard ex Bews—F.T.A. 9: 880; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 33. *Tricholaena rosea* Nees; Holl. 838.
A very common grass, widely spread over the whole of tropical Africa and in Arabia and South Africa; until recently better known as *Tricholaena rosea* Nees. (See Appendix).

90. TRICHOLAENA Schrad.—F.T.A. 9: 908.

Spikelets 2–3 mm. long, glabrous or with the lower valve very minutely and obscurely puberulous near the margins, usually very loosely scattered on capillary pedicels up to 1.2 cm. long; panicles loose, up to 15 cm. long, branches usually paired, the lower often semi-verticillate, filiform; lower glume reduced to a minute hyaline scale, upper about as long as the spikelet, finely 3–5-nerved; lemma similar to the upper glume, 5-nerved, glabrous or minutely and obscurely hairy towards the margins

1. *Monachne*

Spikelets up to nearly 2 mm. long, more approximate and on pedicels up to 6 mm. long; lower lemma appressedly pubescent near the margins; panicle about 9 cm. long, with pairs of unequal branches 2. *delicatula*

1. *T. Monachne* Stapf & Hubbard—F.T.A. 9: 909; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 33. Perennial or annual up to 4 ft. high; culms tufted.
Gold Coast: Labadi, near Accra, in sand near salt water lagoon (Mar.)! Accra Plains (Dec.)! Teshi, near Accra (Nov.)! Widely spread in tropical and S. Africa and Mascarene Islands. Exsicc.—Deighton 574.
Irvine 49; 803.
2. *T. delicatula* Stapf & Hubbard—F.T.A. 9: 911. *Aira bicolor* Schum.? Grows in patches and prostrate.
Gold Coast: Accra! Also in Angola. Exsicc.—T. W. Brown 344.
The specimen quoted is rather poor and may not be quite the same as the Angola plant. If identical with Schumacher's species, then his name would have to be used. More material is necessary to decide the point.

91. MELINIS Beauv.—F.T.A. 9: 916.

Ultimate pedicel-like branchlets of the inflorescence with long slender hairs towards the apex; whole plant more or less pilose; leaf-sheaths closely ribbed; ligule a rim of short white hairs; leaf-blades linear-lanceolate, rounded at the base, acutely acuminate, 5–8 cm. long, 7–8 mm. broad, distinctly 5–6-nerved on each side of the midrib; panicle slender, oblong, about 12 cm. long, with capillary fasciculate branchlets; spikelets often purplish, 1.5 mm. long; lower glume very minute, upper as long as the spikelet; lemma of lower floret with a very fine awn about 8 mm. long 1. *tenuissima*

Ultimate pedicel-like branchlets without long hairs:

Spikelets faintly nerved and not grooved, the awns purplish and very conspicuous; panicle rather dense, with lateral fascicles of branchlets; leaf-blades lanceolate, rounded or narrow at the base, 8–18 cm. long, up to 1.3 cm. broad; internodes shortly pilose towards the top; nodes densely silky-pilose; upper glume 2-lobed, the lobes denticulate 2. *macrochaeta*

Spikelets strongly nerved and grooved, the awns purplish and conspicuous or sometimes absent (forma *inermis*); leaf-blades elongate-linear-lanceolate, rounded at the base, very acute, about 15 cm. long and 1 cm. broad, softly pilose, with about 7 lateral nerves on each side of the midrib; internodes usually pilose; nodes pilose; upper glume shortly 2-lobed 3. *minutiflora*

1. *M. tenuissima* Stapf in Hook. Ic. Pl. 27: t. 2660.—F.T.A. 9: 926. Perennial up to 4 ft. high, more or less glauous; panicles slender; spikelets solitary on slender stalks.
S. Nigeria: between Ibadan and Abeokuta (Mar.)! Ibadan, on burnt ground (Mar.)! Tropical Africa generally and in the Northern Transvaal. Exsicc.—Schlechter 12338. Deighton 546.
2. *M. macrochaeta* Stapf & Hubbard—F.T.A. 9: 927; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 34. Averaging 3–4 ft. high; annual; base of panicle often embraced by the uppermost leaf-sheath.

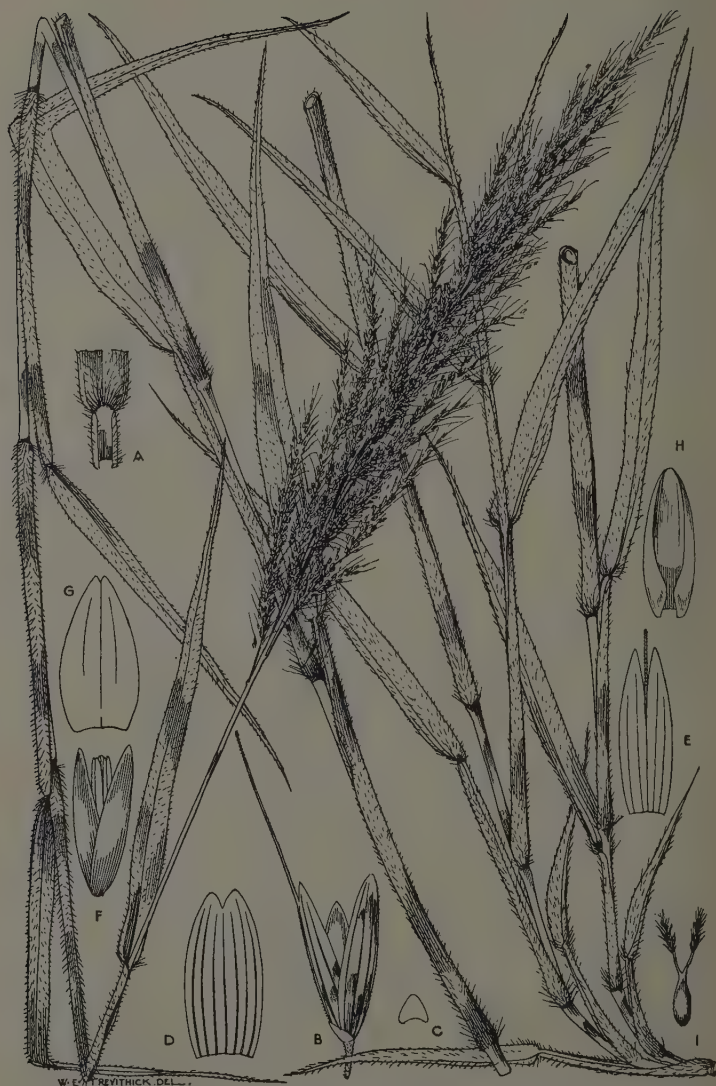


FIG. 372.—*MELINIS MINUTIFLORA* P. Beauv. (GRAMINEAE-PANICEAE).

A, ligule. B, spikelet. C, lower glume. D, upper glume. E, valve of lower floret. F, upper floret. G, lemma. H, palea. I, ovary, styles and stigmas.

- Ivory Coast: Toura country. S. Nigeria: Kabba Road (Oct.)! N. Nigeria: without locality! Tropical Africa generally. Exsicc.—*Parsons* 23. *Lely* 785.
3. *M. minutiflora Beauv.* Agrost. 54, t. xl. fig. iv.—F.T.A. 9: 931; Chev. Bot. 722, and Rev. Bot. Appl. Agric. Trop. 1934: 54; Holl. 840. A strong-smelling, viscous grass.
- Sierra Leone: various localities! Ivory Coast: Dabou (Feb.)! Togo: Mt. Demi, 2,700 ft. (Dec.)! S. Nigeria: Apapa, Lagos (Dec.)! Cameroons Mt.: Buea, 3,000 ft. (Nov.)! Tropical Africa, N. Transvaal, Ascension, and Brazil. Exsicc.—*Dawe* 420; 519. *Deighton* 256. Chev. 17255. *Hoves* 1059. *Dalz.* 1326. *Migeod* 223. (See Appendix).
- forma inermis Stapf & Hubbard.* Awns absent.
- S. Nigeria: Bamenda, 5,000 ft. (Jan.)! to Kenye Kenye Camp, 4,700 ft. (Jan.). Tropical Africa, Mascarenes, and Brazil. Exsicc.—*Maitland* 936; 953. *Migeod* 409. (See Appendix).

92. ANTHEPHORA Schreb.—F.T.A. 9: 933.

Cluster of spikelets pubescent, shortly villous at the base; spikes cylindric, 13–26 cm. long, dense and continuous, pale straw-coloured; leaf-blade closely nerved and finely scaberulous, long-ciliate at the base; sheath closely ribbed, the lower ones shortly tomentose at the base; valve of lower floret long-ciliate at the apex

1. *nigritana*

Cluster of spikelets glabrous:

Cluster of spikelets oblong, slightly constricted above the middle, neither disk-like nor rimmed at the base; spikes about 10 cm. long; rhachis very wavy, angular; ligule very conspicuous, about 3 mm. long; leaf-blade gradually tapered to a sharp point, sheath closely ribbed and thinly pilose; valve of lower floret not ciliate

2. *ampullacea*

Cluster of spikelets broadly conical from a broad concave disk-like rimmed base; spikes 5–10 cm. long, on slender peduncles; rhachis very wavy, narrowly green-winged; leaf-sheaths glabrous or thinly pilose with bulbous-based hairs; blades linear, long-pilose towards the base; valve of lower floret ciliate .. 3. *cristata*

1. *A. nigritana Stapf & Hubbard*—F.T.A. 9: 937. Perennial; culms up to 7 ft. high; leaf-sheaths much longer than the internodes.
- N. Nigeria: Nupe, open plains! Katagum district, in bush! Sokoto, waste places near houses (July)! Exsicc.—*Barter* 1380. *Dalz.* 260; 507.
2. *A. ampullacea Stapf & Hubbard*—F.T.A. 9: 939. Perennial, like the above, but probably dwarfier.
- N. Nigeria: Abok! Exsicc.—*Barter* 463.
3. *A. cristata Hack. ex De Wild. & Durand*—F.T.A. 9: 935; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 34. Annual, up to 3 ft. high; leaf-sheaths as long as or a little longer than the internodes, pilose with long weak hairs.
- Dahomey: Cotonou (Apr.)! S. Nigeria: Lagos! Extends through the Cameroons and Congo to Angola; also in Brazil and Fernando do Noronha. Exsicc.—*Chev.* 23486 bis. *Dawodu* 17. *Dalz.* 1129.

93. PARATHERIA Griseb.—F.T.A. 9: 1084.

Culms rooting at the lower nodes; nodes markedly bearded; lower leaf-sheaths loose, keeled upwards; blades linear, tapered to a fine point, up to 7 cm. long, glabrous or pubescent; ligule a ciliate rim; racemes slender, up to 15 cm. long, more or less sheathed at the base; rhachis terminating in a bristle; spikelets subtended by a solitary long bristle, lanceolate, 1 cm. long, appressed to the bristle; lower floret barren and reduced to the valve, upper hermaphrodite; glumes similar, minute, hyaline, nerveless; lemmas smooth *prostrata*

- P. prostrata Griseb.*—F.T.A. 9: 1085. "An aquatic grass in which cleistogamous spikelets are usually produced at the base of the inflorescence in the axils of the uppermost leaf-sheaths and in the axils of the lower sheaths"—C. E. HUBBARD: perennial, with solitary terminal inflorescences, the spikelets subtended by a long bristle and surrounded by a ring of hairs at the base.
- Sierra Leone: Mabum, 370 ft. (Aug.)! Njala, covering bottom of shallow pools (May)! S. Nigeria: Water pool at Yaba (June)! Also in the Belgian Congo, Madagascar and tropical America. Exsicc.—*Thomas* 1515. *Deighton* 687; 704; 737. *Dalz.* 1423.

94. BECKEROPSIS Fig. & De Not.—F.T.A. 9: 948.

Perennial; leaf-blades firm, lanceolate-linear from a usually long narrow or petiole-like base, tapered to a setaceous tip, up to 60 cm. long, 0.6–1.2 cm. broad, glaucous, scabrid above, margins very rough; racemes on slender peduncles, up to 5 cm. long; basal bristle up to 5 cm. long; spikelets subimbricate, oblong, acute or apiculate, 2.5–3 mm. long, often purplish; glumes minute, rounded or truncate .. 1. *uniseta*

Annual; leaf-blades flaccid, linear from a petiole-like narrow base, up to about 25 cm. long, about 0.6–1.2 cm. broad, scaberulous above, margins rough; racemes on long filiform flexuous peduncles, very slender, up to 5 cm. long; basal bristle up to 4 cm. long 2. *nubica*

1. *B. uniseta K. Schum.*—F.T.A. 9: 949; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 34.
- French Guinea: Baffing Valley (Nov.)! Sierra Leone: Kamietoto, 1,100 ft. (Nov.)! Gold Coast! S. Nigeria: Ida (Oct.)! Ogoja Province! N. Nigeria: Pankshin district; Vodni! Bauchi Plateau (Sept.)! Widely spread in tropical Africa, and in Natal. Exsicc.—*Pobéguin* 1815. *Glanville* 312. *Beal* 30. *Thomas* 1934. *Rosenberg* 8/30A; 19/30A. *Saunders* 4. *Lely* 789; P. 760. (See Appendix).
2. *B. nubica Fig. & De Not.*—F.T.A. 9: 952.
- N. Nigeria: Bauchi Plateau (Sept.)! Cameroons Mt.: Buea (Nov.)! Between Victoria and Bola (Nov.)! Also in St. Thomas Isl. and in N.E. tropical Africa. Exsicc.—*Lely* P. 751. *Migeod* 107. *Maitland* 82.

95. *PENNISETUM* L. Rich.—F.T.A. 9: 954. (See Appendix).

Key to Sections.

Valves more or less alike or the lower sometimes much reduced and shorter than the upper, both frequently membranous or the upper becoming indurated; apex of the valve of upper floret acute or obtuse, glabrous or hairy along the margins; upper floret mostly continuous with the rest of the spikelet; rhachis often finely ribbed below the persistent stumps or scars of the fallen involucre:

Spikelets usually solitary; involucre sessile or subsessile; bristles glabrous or rarely ciliate; valve of upper floret scarcely changed at maturity; lodicules often present; anthers mostly with glabrous tips; styles free or connate .. I. *GYMNOTRIX*

Spikelets 1-4 or more in each involucre; involucre sessile or shortly stalked; all bristles, or at least the inner plumose, rarely glabrous; styles usually connate:

Anther-tips glabrous; valve of upper floret scarcely changed at maturity, membranous or thinly chartaceous, not shining .. II. *EU-PENNISETUM*

Anther-tips conspicuously penicillate; valve of upper floret more or less hardened and chartaceous or coriaceous at maturity, very smooth and shining in the lower two-thirds .. III. *PENICILLARIA*

Valves very heteromorphic, the lower thinly membranous, often 3-lobed, the upper shorter, chartaceous, smooth and shining, truncate or very obtuse, ciliate at the apex; upper floret readily disarticulating from the rest of the spikelet; rhachis with decurrent wings below the scars of the fallen involucre .. IV. *BREVIVALVULA*

Sect. I.—*GYMNOTRIX*

Culms with 2 or more inflorescences from the upper nodes; ligule reduced to a densely ciliate rim; nodes glabrous; terminal bristle up to 3 cm. long; styles connate for about half their length; leaf-blades linear-lanceolate, sharply contracted at the base, tapered to a fine point, up to 45 cm. long and 2 cm. broad; false spikes rather lax, up to 25 cm. long .. 1. *trachyphyllum*

Culms terminated by a solitary inflorescence:

Upper glume from $\frac{1}{2}$ the length to as long as the spikelet, 5-7-nerved:

Terminal bristle of involucre up to 1.4 cm. long; perennial grasses with 4-many-noded tough or woody culms; spikelets 7-8 mm. long; inner bristles of the involucre usually ciliate; leaf-blades narrowly linear to subsetaceous, tapered to a hard tip, up to 15 cm. long and 5 mm. broad, closely nerved and very scabrid above; false spike up to 12 cm. long; inner bristles ciliate below the middle .. 2. *dichotomum*

Terminal bristle of involucre 1.5-3 cm. long; annual or biennial with compressed 4-5-noded culms; false spike up to 10 cm. long, the involucre deciduous except the lower ones, leaving the rough pitted rhachis; bristles scabrid, inner not ciliate; leaf-blades smooth .. 3. *ramosum*

Upper glume up to half as long as the spikelet, 1-3-nerved or nerveless:

Lower floret σ ; bristles 25-45 to each involucre, scaberulous; upper glume lanceolate or narrowly ovate; lower lemma 7-9-nerved; leaves glaucous, glabrous, linear, tapered to a hard point, up to 24 cm. long and 7 mm. broad; false spike dense, 10-17 cm. long .. 4. *togoense*

Lower floret barren and reduced to the valve; bristles 20-40 to each involucre, purplish, scaberulous, the inner rarely ciliate; upper glume broadly ovate or ovate-oblong, up to 2 mm. long; leaf-blades linear, long-tapered to a fine setaceous point, loosely pilose or glabrous; false spike up to 10 cm. long .. 5. *monostigma*

Sect. II.—*EU-PENNISETUM*

Densely tufted perennial; leaf-sheaths ciliate and bearded towards the top; blades narrowly linear, tapered to a fine point, scabrid on the margins; false spike dense; bristles plumose, pale or mauve; upper glume 0-1-nerved, up to 5 mm. long .. 6. *setaceum*

Sect. III.—*PENICILLARIA*

Perennial, very tall, up to 8 m. high; false spike mostly about 30 cm. long, yellowish or rarely purplish; rhachis softly villous; bristles numerous, unequal, scaberulous except sometimes the inner slightly plumose; ligule a densely ciliate rim; blade linear, tapered to a fine point, up to 4 cm. broad, usually pilose .. 7. *purpureum*

Annals:

Wild grasses; spikelets glabrous, lanceolate and acuminate in outline in the flowering condition, readily deciduous when mature:

Robust, with stiffly erect branches; leaves more or less glaucous, firm; fascicles of spikelets not fluffy; false spike about 10 cm. long, softly pilose; inner involucral bristles equal in length; lower lemma elliptic-oblong, truncate or emarginate .. 8. *ochrops*

Not robust, more or less geniculate with often oblique branches; leaves green, more

or less flaccid; fascicles of spikelets more or less fluffy with long hairs on the bristles:

- Involucral bristles equal in length; valves subacute; long-pilose all over; false spikes about 15 cm. long; rhachis softly villous; leaves about 1.3 cm. broad, strongly nerved 9. *mollissimum*
 Involucral bristles unequal; valves obtuse; false spikes very "fox-tail"-like, about 15 cm. long; leaves nearly glabrous, at most 1 cm. wide at the base

10. *Rogeri*

Cultivated grasses or often degenerated escapes from cultivation, or weeds in cultivated fields:

*Spikelets readily deciduous; grain not exerted from the spikelet:

Spikelets quite glabrous and smooth or with the upper valve minutely rough upwards towards the margins, not ciliate or bearded; lower valve often minute, up to 1 mm. long:

Culms up to 1.25 m. high, erect or only slightly geniculate, slender; false spikes 10-15 cm. long, white-silky with fine bristles, the inner plumose; leaves thinly pilose 11. *Barteri*

Culms low, weak, divaricately branched; false spike up to 8 cm. long, with fine bristles, the inner very plumose; leaves thinly pilose 12. *violaceum*

Spikelets hairy along the margins of the upper valve or very rarely only rough and then with the lower valve well developed, 3-5-nerved:

Bristles glabrous or a very few of the inner sparsely plumose below the middle; spikelets ovate-oblong, to 6.5 mm. long; false spikes 15-20 cm. long, pale or violet-purple; leaves about 2 cm. broad, closely nerved, almost auriculate at the base 13. *Dalzielii*

Bristles partly glabrous (the outer) and partly (the inner 6-25) conspicuously plumose; upper valve ovate to ovate-elliptic, mostly pubescent near the margins, rarely glabrous:

Upper valve ovate, with few and minute hairs near the margins upwards, or glabrous; spikelets up to 6 mm. long:

Fascicles of spikelets rather slender, with or without an elongated terminal bristle, straw-coloured to purplish; false spikes about 10 cm. long; leaves tapered to a fine point, sheaths long-pilose towards the top

14. *stenostachyum*

Fascicles of spikelets plump, without an elongated terminal bristle, dark-brown or purple; false spikes dense, up to 20 cm. long; leaves lanceolate, tapered to a fine acute tip, 20 cm. long, 2 cm. broad, sheaths ciliate upwards

15. *Perrottetii*

Upper valve ovate to ovate-elliptic, distinctly pubescent or almost bearded along the margins, or, if glabrous, then with spikelets over 7 mm. long:

Culms hard and firm, not compressible:

Culms about 1 m. high, like the leaves very glaucous, fasciated at the base, simple or branched above it, the lowest internode deeply channelled; leaf-blades up to 1 cm. broad; lower floret usually male, with a well-developed 3-5-nerved lemma 16. *sclerocladum*

Culms up to 3 m. high; lower internodes terete; leaf-blades up to 3 cm. broad; lower floret much-reduced, barren, with a small faintly 3-4-nerved lemma 17. *Sampsonii*

Culms compressible, stout, densely bearded at the upper nodes; spikelets 4-5 mm. long; bristles about 6 mm. long, sometimes the terminal slightly longer; fascicles sessile or subsessile; blades lanceolate, rounded at the base, up to 0.75 m. long and 3 cm. broad, sparsely hirsute or glabrous

18. *niloticum*

**Spikelets usually persistent; grain usually exerted from the gaping valve and valvule:

†Terminal bristle of the involucre much longer and stouter than the rest:

Spikelets usually solitary; involucre subsessile or with a peduncle up to 1 mm. long; upper valve 7-9-nerved; false spike very dense, up to 50 cm. long, dark purple 19. *ancylochaete*

Spikelets in clusters of 2-5, very rarely solitary; involucre pedunculate; upper valve 5-7- (rarely 9-) nerved; false spike very dense, up to 50 cm. long, yellowish or brown 20. *pycnostachyum*

††Inner bristles of the involucre subequal and without one conspicuously exceeding the rest:

Inner bristles scaberulous or a few of them (2-6) sparsely ciliate; false spike long-cylindric, up to 1.5 m. long, stramineous or purple, at length paler; leaf-blades up to 0.75 m. long and 5 cm. broad, loosely to densely hairy or glabrous

21. *nigritarum*

Inner bristles distinctly ciliate or plumose, rarely scaberulous and then with the false spike not long-cylindric; grain not depressed or flat on the top:

- False spike 15 cm. or more long, 1.2-3.5 cm. broad; culms stout, up to 4 m. high :
 False spike linear, regularly cylindric, 25-60 cm. long, 12-16 times as long as wide :
 Inner bristles (6-18) loosely plumose around the spikelet and with scaberulous tips :
 Grain oblanceolate or narrowly elliptic, pointed at the top .. 22. *leonis*
 Grain broadly obovoid to narrowly obovoid or pyriform, rounded at the top .. 23. *gambiense*
 Inner bristles (10-25) densely plumose for their whole length or nearly so .. 24. *maiwa*
 False spike linear-lanceolate, up to 22 cm. long, 6-7 times as long as broad; inner bristles scantily plumose .. 25. *cinereum*
 False spike up to 8 cm. long, 7-11 mm. broad; culms slender, up to 1 m. high; grains gibbous .. 26. *gibbosum*

Sect. IV.—BREVIVALVULA

Spikelets solitary and sessile within the involucre :

Spikelets 2.5-5 mm. long; false spike 5-10 mm. wide (excluding the bristles); terminal bristle up to 3 cm. long; perennial, rarely annual :

Bristles densely plumose around the spikelet or at least the inner bristles plumose; false spike usually very dense, up to 25 cm. long, purple, reddish-brown or orange-brown; rhachis finely scaberulous .. 27. *polystachyon*

Bristles glabrous, very rarely one or two slightly ciliate; false spike dense, up to 20 cm. long, purplish to orange-brown; rhachis angular, minutely scaberulous on the angles .. 28. *atrichum*

Spikelets 2.5-2.75 mm. long; false spike 4-6 mm. wide (without the bristles); terminal bristle up to 1.5 cm. long; annuals :

Bristles densely plumose around the spikelet, or at least the inner plumose; false spike up to 15 cm. long, purplish .. 29. *subangustum*

Bristles glabrous and scaberulous; false spike up to 14 cm. long, purple, reddish or brownish .. 30. *hordeoides*

Spikelets solitary and pedicelled within the involucre, or in clusters of 2-5, with one sessile and the others pedicelled; bristles densely plumose around the spikelets; false spike up to 15 cm. long, white, pale, purplish or reddish, woolly when mature; rhachis glabrous .. 31. *pedicellatum*

1. *Pennisetum trachyphyllum* Pilger.—F.T.A. 9: 967. Perennial up to 6 ft. high. Cameroons Mt.: Buea, 3,000 ft. (Jan.)! Also in East Africa from the mts. of Kenya and Uganda south to Kilimanjaro. Exsicc.—Mailand 341.
2. *P. dichotomum* Del.—F.T.A. 9: 972. A bushy perennial with a stout woody rootstock. French Sudan: Hoggar Mts.; Oued Taharanet, 4,900 ft. (Mar.)! Also in N. Africa to Arabia and N.W. India; and in British Somaliland. Exsicc.—Meinertzhagen 231; 234.
3. *P. ramosum* Schweinf.—F.T.A. 9: 976. Annual or biennial, up to 4 ft. high, conspicuous by the short spikes with deciduous involucre. N. Nigeria: near Kingowa and Marte (Oct.)! Through French Equatorial Africa to the Eastern Sudan, Eritrea south to Uganda and Tanganyika Territory. Exsicc.—Golding 27.
4. *P. togoense* Mez.—F.T.A. 9: 983. Dahomey: between Sokode and Basari, Koert-fall, 1,300 ft.! Exsicc.—Kerating 698.
5. *P. monostigma* Pilger—K.T.A. 9: 992. A tufted perennial up to 3 ft. Cameroons Mt.: 7,000-10,000 ft., common above the timber line (Nov.-Feb.)! Fernando Po: 8,500-9,300 ft.! Exsicc.—Mann 1348; 1463; 2081. Johnston. Mailand 345; 641; 869; 881; 918; 944; 1043; 1229; 1264. Migeod 169. Midbr. 10842. Dunlap 217. Steele 44; 49; 99.
6. *P. setaceum* Chiov.—F.T.A. 9: 1013. French Sudan: Haggat Mts.; Oued Tamanrasset, 5,000 ft. (Feb.)! Also in N. Africa to Arabia, and in N.E. Tropical Africa and Socotra. Exsicc.—Meinertzhagen 195.
7. *P. purpureum* Schum.—F.T.A. 9: 1016; Holl. 842. A robust perennial often forming large bamboo-like clumps up to 25 ft. high. Throughout the area, on the banks of streams and in water; widely spread in tropical Africa and introduced into most tropical countries.
8. *P. ochrops* Stapf & C. E. Hubbard—F.T.A. 9: 1021. Annual up to 5 ft. N. Nigeria: common near Lake Chad! Also in Darfur, E. Sudan. Exsicc.—Golding 22. A. Chev. l.c. also records a related species, *P. darfuricum* Stapf & Hubbard, from Nioro, etc., in French Sudan. It was known previously only from Darfur, Eastern Sudan, and I have not seen a specimen from our area.
9. *P. mollissimum* Hochst.—F.T.A. 9: 1022. Annual 2 ft. or so high. Senegal: Thiès to St. Louis! French Sudan: Gao (Sept.)! Timbuktu! Gourma to Haoussa (July)! Between Tahoua and Ingall, on the edge of the Sahara! Extends through the Shari region to the Eastern Sudan. Exsicc.—Chev. 2265; 43321. Hagerup 340. Chudeau. Rugeon 448.
10. *P. Rogeri* Stapf & C. E. Hubbard—F.T.A. 9: 1023. Senegal: very common in cultivation! Exsicc.—Chev. 33924. Roger.
11. *P. Barteri* Stapf & C. E. Hubbard—F.T.A. 9: 1026. N. Nigeria: Nupe, in fields! Exsicc.—Barter 1376.
12. *P. violaceum* L. Rich.—F.T.A. 9: 1027. Annual up to 1½ ft. high. Senegal: Dakar! Longa! Central Sahara! Exsicc.—Rattray. Chev. 34027. Roussillon. Schotte. Chudeau. Jardin.
13. *P. Dalzielii* Stapf & C. E. Hubbard—F.T.A. 9: 1030. Annual, rarely over 8 ft. high. N. Nigeria: Sokoto Prov.! Exsicc.—Dolz. 511; 512; 513.
14. *P. stenostachyum* Stapf & C. E. Hubbard—F.T.A. 9: 1031. Annual up to 4 ft. Senegal: Caybar! Mbambey (Nov.)! Galom! Near St. Louis! Mbidjem! Exsicc.—Leprieur 9; 42. Chev. 33956. Heudelot 299 (part). Roger. Thierry. Schotte.
15. *P. Perrottetii* K. Schum.—F.T.A. 9: 1032. Senegal: Walo! Thiès to St. Louis, in fields (June)! Exsicc.—Chev. 2266.



FIG. 373.—*Pennisetum purpureum* Schum. (GRAMINEAE-PANICEAE).

A, ligule. B, spikelet surrounded by bristles. C, spikelet. C₁, lower glume. C₂, upper glume. D, lemma of upper floret. E, palea. F, stamens and pistil. G, stamen.

16. *P. sclerocladum* Stapf & C. E. Hubbard—F.T.A. 9: 1033.
Gambia: near Georgetown (Jan.)! Exsicc.—Sampson 56.
17. *P. Sampsonii* Stapf & C. E. Hubbard—F.T.A. 9: 1034.
N. Nigeria: Ilorin, in cultivated land (Dec.)! Exsicc.—Sampson 44.
18. *P. niloticum* Stapf & C. E. Hubbard—F.T.A. 9: 1038.
Senegal: Galom! Also in French Cameroons, Egypt and E. Sudan. Exsicc.—Heudelot 299, partly.
19. *P. ancylochaete* Stapf & C. E. Hubbard—F.T.A. 9: 1040.
N. Nigeria: Katagum district! Exsicc.—Dolz 294.
20. *P. pycnostachyum* Stapf & C. E. Hubbard—F.T.A. 9: 1041.
Senegal: Dakar! Tivouane! Gambia! Sierra Leone! Exsicc.—Rattray. Chev. 2213. Roger.
Pirie 3. Sampson. *Afzelius. Jardin.*
21. *P. nigritarum* Durand & Schinz—F.T.A. 9: 1045.
Senegal: near Richard-Tol. N. Nigeria: Sokoto Prov. Katagum district! Kano! Nupe! Kalkala (Aug.)! S. Nigeria: Aburi! Exsicc.—Lelievre. Dolz. 294, partly; 514; 515; 516. Sampson. Barter-1952. Johnson 1042. Gwynn.
22. *P. leonis* Stapf & C. E. Hubbard—F.T.A. 9: 1046.
Sierra Leone: Njala! Port Lokko! Kamalu (May)! Exsicc.—Deighton 1796. Sampson 49. Thomas 350.
23. *P. gambiense* Stapf & C. E. Hubbard—F.T.A. 9: 1047.
Gambia, throughout (Nov.)! Gold Coast! Exsicc.—Pirie 5. Dir. of Agric. 13; 14; 15. Thomas.
24. *P. maiwa* Stapf & C. E. Hubbard—F.T.A. 9: 1048.
S. Nigeria: Kafaushan (Dec.)! N. Nigeria: Ilorin! Yandev! Katagum district! Exsicc.—Sampson 32; 41; 43. Dolz. 295.
25. *P. cinereum* Stapf & C. E. Hubbard—F.T.A. 9: 1048.
Gold Coast: Tamale (Nov.)! Northern Territories! Exsicc.—Sampson 5. Williams 520.
26. *P. gibbosum* Stapf & C. E. Hubbard—F.T.A. 9: 1049.
N. Nigeria: shores of Lake Chad, cultivated (Aug.)! Exsicc.—Lamb 109.
27. *P. polystachyon* Schult.—F.T.A. 9: 1057; Holl. 841.
Throughout the area and in the tropics and subtropics generally.
28. *P. atrichum* Stapf & C. E. Hubbard—F.T.A. 9: 1061.
French Guinea: Timbo! Kaikan! N. Nigeria: Fakun, Borgu! Naraguta, near water! Extends through the Congo to Kenya, Nyasaland and N. Rhodesia. Exsicc.—Pobéguin 1761 partly. Chev. 15662. Barter 842. Lely 439.
29. *P. subangustum* Stapf & C. E. Hubbard—F.T.A. 9: 1062.
Senegal to N. and S. Nigeria, French Cameroons and the Congo.
30. *P. hordeoides* Steud.—F.T.A. 9: 1063.
Senegal to N. and S. Nigeria and Fernando Po. Extends to Angola; also in India.
31. *P. pedicellatum* Trin.—F.T.A. 9: 1065; Holl. 841.
Throughout the area, and in Cape Verdes, and through the French Cameroons and Shari to N.E. tropical Africa and in India.

Imperfectly known species and forms.

- P. americanum* K. Schum forma *senegalensis* Leeke in Zeitschr. Naturwiss. 79: 60, t. ii. figs. 2a and b.—F.T.A. 9: 1067.
Senegal. Exsicc.—Bacle.
Noted as probably a cultivated form of *P. Rogeri* Stapf & C. E. Hubbard.
- forma *gigantea* Leeke l.c. 63 t. iii. fig. 4.—F.T.A. 9: 1067.
Dahomey. Bismarckburg. Also in Tanganyika. Exsicc.—Buettner 300.
Noted as a cultivated form similar to *P. cinereum* and *P. typhoides*.
- forma *fusispica* Leeke l.c. 69, t. iii. fig. 7.
Sierra Leone. Togoland. Probably *P. leonis*.
- P. senegalense* Steud. ex Jard.—F.T.A. 9: 1070, name only.
Senegal. Exsicc.—Jardin.

96. *CENCHRUS* Linn.—F.T.A. 9: 1070. (See Appendix).

Bristles subtending the spikelets minutely antrorsely scabrid-barbellate, very slender: Inner bristles subequal; annual; leaf-sheaths loose, minutely scabrid; blade tapered from the base to a fine point, 7–25 cm. long, minutely scabrid; ligule a very densely ciliate rim; inflorescence spike-like, continuous, up to 15 cm. long and 2.5 cm. broad; rhachis flexuose, sharply angular; inner bristles broader and densely ciliate towards the base; spikelets paired in each cluster, 5 mm. long; lower glume very small or suppressed, upper ovate, acute, 3–4 mm. long, 3–5-nerved 1. *Prieuri*

Inner bristles very unequal, one much longer than the others; perennial; leaf-sheaths exposing the nodes, closely ribbed, sometimes with a few long-bulbous-based hairs towards the top; blade linear, tapered to a long very acute point, up to 20 cm. long, closely nerved, finely scabrid and often thinly pilose; ligule a narrow densely ciliate rim; inflorescence spike-like, continuous, cylindric, up to 10 cm. long and 2 cm. broad; inner bristles broader and ciliate towards the base; spikelets 1–3 in each cluster of bristles, about 5 mm. long; glumes hyaline, 1-nerved 2. *ciliaris*

Bristles subtending the spikelets retrorsely barbellate, up to 6 mm. long, very stiff, the inner subequal, densely ciliate in the lower half; leaf-sheaths glabrous or nearly so; blades tapered to a rigid sharp point, closely nerved; ligule a densely ciliate rim; inflorescence loosely spike-like, usually about 7 cm., but up to 14 cm. long, about 1 cm. broad 3. *biflorus*

1. *C. Prieuri* Maire—F.T.A. 9: 1071. *Pennisetum Prieuri* Kunth; Fl. Brit. Ind. 7: 89. *Cenchrus macrostachys* Hochst.; Chev. Rev. Bot. Appl. Agric. Trop. 1934: 40. Annual up to 2½ ft. high, with straw-coloured or purplish spikes.
Senegal! French Sudan: Zinder (Nov.)! Timbuktu (Aug.)! At! Extends through the Southern Sahara to the Eastern Sudan and Abyssinia and to India. Exsicc.—Adamson. Leprieur. Roger. Hagerup 274; 611a. Chudeau.
2. *C. ciliaris* Linn. Mant. 302. *Pennisetum cenchroides* Rich.—Fl. Cap. 7: 433. *P. Prieuri* A. Chev. Bot. 736, not of Kunth. A perennial; culms ascending from a branched geniculate often decumbent many-noded base.



FIG. 374.—*IMPERATA CYLINDRICA* Beauv. (GRAMINEAE-ANDROPOGONEAE).

A, ligule. B, portion of flowering branch. C, spikelet enveloped by long hairs. C', spikelet. D, joint.

Mauritania (Feb.). Senegal: Wallo (Aug.-Oct.)! French Sudan: Sompe (Aug.)! Timbuktu (July). Ras-el-Mâ (Aug.)! Bamba (Sept.)! Air, 6,000 ft. (Feb.)! Gold Coast: Achimota (?)! Throughout Africa, and in South Europe eastwards to north-west India. Exsicc.—Roger 61. *Leprieur*. Chev. 2165; 2166. *Hagerup* 322. *Rogson* 43388. *Irvine*.

3. *C. biflorus* Rozb. Hort. Beng. 81; Fl. Ind. 1: 233. *C. barbatus* Schum.—F.T.A. 9: 1079. *C. catharticus* Del.—Chev. Bot. 734, and Rev. Bot. Appl. Agric. Trop. 1934: 39; Holl. 846. Annual, up to 3½ ft. high with prickly spikes up to 6 in. long. Throughout the area, and in tropical Africa generally; also in India and introduced into the United States.

97. IMPERATA Cyr.—F.T.A. 9: 87.

Culms up to 1.25 m. high, erect; leaf-sheaths loose, the lowest persisting after burning and fibrous; ligule short, pubescent; leaf-blades linear from a tapered base, acute, up to 30 cm. long and 1 cm. broad, very closely nerved, glabrous except the pilose margin at the base and the scabrid edges; inflorescence spike-like ("fox-tail"), up to 20 cm. long, very densely long-villous and silky-soft to the touch; pedicels unequal; spikelets all alike; stigmas densely pubescent, brown or purplish

cylindrica

1. *cylindrica* Beauv.—F.T.A. 9, 1: 87; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 855; Holl. 777.

Widely distributed throughout the warmer parts of the Old World; the typical form occurs from the Mediterranean region to N.W. India; in tropical Africa two varieties are recognised, var. *Thunbergii* Dur. & Schinz (Stapf l.c. 88), with the leaf-sheaths usually glabrous at the nodes, and var. *Koenigii* Dur. & Schinz (Stapf l.c.), with the leaf-sheaths generally long-bearded at the nodes. It is a very widely spread grass varying slightly under different local conditions. (See Appendix).

98. ERIOCHRYSIS Beauv.—F.T.A. 9: 91.

Slender perennial up to 1.3 m. high; nodes bearded; ligule short and truncate, with long hairs; leaf-blades linear, up to 25 cm. long, glabrous to closely appressed-pilose below; panicle very narrow and raceme-like, softly fulvous, 12–15 cm. long; rhachis terete, pilose at the nodes; racemes 3–4 cm. long, ascending; sessile spikelet with a bunch of long fulvous hairs at the base; lower glume broadly lanceolate, slightly shining and glabrous except at the minutely 3-dentate tip; pedicelled spikelet similar to the sessile but smaller *brachypogon*

- E. *brachypogon* Stapf—F.T.A. 9, 1: 93; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 856. *Saccharum brachypogon* Stapf—Chev. Bot. 713.
French Sudan: Tabacroni, in marshy places (Apr.). N. Nigeria: Nupe, open plains! Through the North Central Region to North Tanganyika Territory and south from there to S.E. Rhodesia; also in Belgian Congo. Exsicc.—Barter 1351.

99. SACCHARUM Linn.—F.T.A. 9: 94. (See Appendix).

Leaf-blades about 1 cm. broad; spikelets 4–6 mm. long, surrounded from the callus by silky hairs up to 12 mm. long; lower glume chartaceous and reddish at the base; racemes up to 10 cm. long, arranged in a rather narrow oblong panicle up to 45 cm. long 1. *spontanæum* var. *ægyptiacum*

Leaf-blades about 4 cm. broad; spikelets up to 4 mm. long, the surrounding hairs shorter than above; lower glume subhyaline, whitish throughout; racemes up to 10 cm. long, arranged in a broad pyramidal panicle up to over 1 m. long

2. *officinærum*

1. *S. spontanæum* Linn. var. *ægyptiacum* Hack.—F.T.A. 9: 95; Holl. 787. *S. biflorum* Forsk.—Chev. Rev. Bot. Appl. Agric. Trop. 1933: 856. Culms up to about 12 ft., many-noded; leaf-sheaths tight, terete; ligules short, membranous, long-ciliate from the back.

N. Nigeria: Katagum district! Bauchi Plateau! Nupe! Nun R. (Sept.)! Extends to Syria, and in East Africa south to Nyasaland. Exsicc.—Dolz. 277. *Lely* 776. *Barter* 925. *Mann* 536. *Vogel* 33.

2. *S. officinærum* Linn.—F.T.A. 9: 96; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 856; Holl. 779. Culms up to 20 ft., many-noded; ligules very short, membranous, ciliate.

N. Nigeria: Sokoto! Tropical Africa generally. Exsicc.—*Lely* 139.

100. SORGHUM Pers.¹—F.T.A. 9: 104; Holl. 788. (See Appendix).

Primary branches of panicle whorled (at least at the lower nodes); pedicelled spikelets usually developed, although sometimes much reduced; lodicules ciliate;

Mature sessile spikelets deciduous with the adjoining joint of the rhachis and its pedicelled companion; grains included in the glumes; spontaneous:

Sessile spikelets lanceolate, 6–8 mm. long; leaves usually narrow, 0.5–2 or sometimes 3 cm. broad:

Sessile spikelets narrowly lanceolate, 6–7.5 mm. long, 2–2.3 mm. broad; awn slender, up to 16 mm. long; grains narrowly obovoid, about 3 mm. long and 2 mm. broad; panicle usually very long and narrow; leaf-blades 0.5–2.2 cm. broad

1. *virgatum*

Sessile spikelets broadly lanceolate, 6.5–8 mm. long, 2.5–3 mm. broad; awn rather stout, 8–18 mm. long; grains elliptic-oblong, 3.5–4.5 mm. long, 2–2.5 mm. wide; panicle ovate to lanceolate, rather small and sparsely branched; leaf-blades 1–3 cm. broad 2. *lanceolatum*

¹ Compiled with the kind assistance of Mr. J. D. Snowden from the MSS. of his revision shortly to be published.

- Sessile spikelets elliptic- or oblong-lanceolate to elliptic-oblong, elliptic or oblong; leaves broad:
- Upper lemma usually with an awn 12-16 mm. long; sessile spikelets 2.5-3.5 mm. broad, oblong-lanceolate 8-9 mm. long; grains elliptic to obovate-elliptic, about 3.5 mm. long, 2 mm. broad; panicle large, loose, ovate to pyramidal; leaf-blades 1-6.5 cm. broad 3. *Vogelianum*
- Upper lemma mucronate or with a short awn up to 8 or 10 mm. long; sessile spikelets 2-2.5 mm. broad, oblong-lanceolate to elliptic-lanceolate, 6-7.5 mm. broad, grains obovate to obovate-elliptic, 2-3 mm. long, 1.5-2 mm. broad; panicle loose, ovate to elliptic or pyramidal; leaf-blades 2.5-6.5 cm. broad 4. *arundinaceum*
- Mature sessile spikelets persistent; grains often exceeding the glumes and exposed; cultivated:
- Sessile spikelets lanceolate, elliptic or oblong, usually twice as long as broad when in flower, never broadest above the middle, even when in fruit and never transversely wrinkled or depressed across the middle:
- Glumes of the sessile spikelets coriaceous, with the nerves usually more or less obscure except towards the tips; pedicels of the pedicelled spikelets long and slender, usually 2-4 mm. long; panicle loose or rarely contracted but not densely compact:
- Sessile spikelets closed or almost closed when mature with the glumes tightly embracing the shorter grains:
- Sessile spikelets lanceolate, elliptic-lanceolate or narrowly elliptic, 4.5-5.5 mm. long, 2-2.5 mm. broad; upper lemma sometimes mucronate; pedicelled spikelets deciduous 5. *aterrimum*
- Sessile spikelets broadly oblong-lanceolate and elliptic-ovate, 5-6 mm. long, 2.5-3.5 mm. broad; upper lemma awned; pedicelled spikelets persistent, or at length deciduous 6. *Drummondii*
- Sessile spikelets opening when mature and more or less exposing the grains:
- Mature grains as long as or shorter than the glumes, rarely longer but then compressed and flattened and with the margins of the glumes more or less involute; spikelets often widely gaping with the grains loosely held:
- Pedicelled spikelets deciduous when mature; lower glume of sessile spikelets with the keels more or less distinctly winged in the upper half or third and terminating in minute teeth:
- Sessile spikelets up to 3 mm. broad in fruit, lanceolate to elliptic- or oblong-lanceolate, 4.5-6 mm. long; lower glume shortly acute or obtuse, distinctly 3-toothed at the tip with the lateral teeth almost as long as the middle one; upper lemma usually long-awned; grains 3-4.5 mm. long, 2.5-3 mm. broad; much shorter than the glumes 7. *margaritifera*
- Sessile spikelets up to 4 mm. broad when in fruit, elliptic-oblong to elliptic-ovate, acute or acuminate; lower glume more or less 3-toothed at the tip but with the teeth of the keels short and with the middle tooth much longer than the lateral teeth; upper lemma mucronate or less often awned; grains 5-7.5 mm. long, 4-5.5 mm. broad, subequal to or rarely longer than the glumes 8. *guineense*
- Pedicelled spikelets persistent; lower glume of sessile spikelets with the keels more or less winged from just above the middle, rarely wingless; sessile spikelets elliptic to elliptic-ovate, 5-6.5 mm. long, awned or mucronate; grains clasped by one or both glumes, rarely almost enclosed; culms sweet 9. *mellitum*
- Mature grains exceeding the glumes in length:
- Pedicelled spikelets persistent; sessile spikelets 4-5 mm. long; mature grains more or less compressed and flattened, readily falling from the widely gaping glumes whose margins are involute 10. *gambicum*
- Pedicelled spikelets deciduous; sessile spikelets 4.5-6 mm. long; grains biconvex or rarely slightly compressed and flattened, firmly clasped at the base by the glumes 11. *exsertum*
- Glumes of sessile spikelets thinly crustaceous to papery and more or less striately nerved to or below the middle; sessile spikelets elliptic-oblong or oblong, 5-11 mm. long; grains shorter than the glumes, remaining enclosed or at length exposed at the top 12. *membranaceum*
- Sessile spikelets more or less obovate or obovate-elliptic or obovate-oblong (at least when in fruit):
- Panicle loose and comparatively glabrous; upper lemma mostly mucronate:
- Sessile spikelets broadly obovate-elliptic to obovate or rhomboid; grains usually much longer than the glumes, 4-6.5 mm. long; pedicelled spikelets persistent 13. *elegans*
- Sessile spikelets elliptic to elliptic-oblong, at length somewhat obovate-elliptic or obovate-oblong, 4-5.5 mm. long; grains 5-6.5 mm. long; pedicelled spikelets deciduous 14. *notabile*

- Panicle contracted and dense to compact, sometimes looser but then branches hairy to villous :
- Sessile spikelets slightly obovate-elliptic or somewhat obovate-oblong, at least when in fruit ; lower glume with the tip more or less obscurely nerved ; mature grains usually much exceeding the glumes in length :
- Sessile spikelets broadly oblong to obovate-oblong to obovate-rounded, 2.5-3.5 mm. long, 2-3.5 mm. broad, sparsely hairy or glabrescent ; upper lemma mucronate or rarely with a short awn ; grains mostly biconvex with a broad top, 3-4 (rarely 4-5) mm. long and broad 15. *nigricans*
- Sessile spikelets oblong or elliptic to obovate-oblong or obovate-elliptic, 3.5-5.5 mm. long, 2-4 mm. broad, hairy or almost glabrous ; upper lemma usually mucronate ; grains mostly bulging on the back and flattened on the face, 3.5-6 mm. long, 3-5 mm. broad 16. *caudatum*
- Sessile spikelets broadly obovate-elliptic or the lower glume with a large strongly nerved herbaceous tip :
- Lower glume of sessile spikelets coriaceous up to the middle or more, not transversely wrinkled and depressed about the middle ; sessile spikelets 4.5-6 mm. long 17. *durra*
- Lower glume of sessile spikelets more or less thin and papery and often distinctly transversely wrinkled and depressed about the middle ; sessile spikelets 4-6 mm. long 18. *cernuum*
- Primary branches of panicles usually solitary, divided from the base and apparently subverticillate ; pedicelled spikelets suppressed, but pedicels present ; lodicules not ciliate :
- Perennial ; racemes with 4-7 sessile spikelets, never all reduced to a solitary spikelet ; primary branches of panicles repeatedly divided 19. *trichopus*
- Annual ; all racemes reduced to a solitary spikelet, accompanied by two empty pedicels ; glumes coriaceous, brown, the lower whitish at the base, 5 mm. long 20. *bipennatum*
1. *Sorghum virgatum* Stapf—F.T.A. 9: 111 ; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 857. Mauritania : Adrar. Air. Senegal ! Also in Eastern Sudan and Egypt. Exsicc.—Heudelot 544 ; 654.
 2. *S. lanceolatum* Stapf—F.T.A. 9: 112 ; A. Chev. l.c. 857. French Sudan : El Oudjadj ! N. Nigeria : Katagum, by rivers ! Kwarre (Nov.) ! Bauchi Plateau ! Also in Eastern Sudan and Rhodesia. Exsicc.—Chev. 43947. Dalz. 293. Sampson 25 ; 26 ; 27. Lely 778.
 3. *S. vogliianum* Stapf—F.T.A. 9: 116 ; A. Chev. l.c. 857. S. Nigeria : banks of Nun River ! Idu, Bugenni River (Sept.) ! Makurdi (Nov.) ! Cameroons R. (Jan.) ! Exsicc.—Vogel 11. Holland 153. Sampson 37. Mann 2109.
 4. *S. arundinaceum* Stapf—F.T.A. 9: 114 ; A. Chev. l.c. 857. Sierra Leone to S. Nigeria and Fernando Po, south to Gabon and Belgian Congo. Exsicc.—Glanville 317. Thomas 2637 ; 7714. Lander 508. Chev. 22424. Lloyd Williams 844. Johnson 799. Dalz. 1322 ; 8423. Irvine 1938. Howes 1203 ; 1211. Mann 114. Maitland 977. Vogel 50. Barter 1379.
 5. *S. atterrimum* Stapf—F.T.A. 9: 121. French Guinea : Kouroussa (Dec.) ! Also in Eastern Sudan. Exsicc.—Pobéguin 539.
 6. *S. Drummondii* Nees ex Steud.—F.T.A. 9: 122 ; A. Chev. l.c. 857. Senegal, near the sea (fide Chevalier). Also in Princes Island and Angola.
 7. *S. margaritiflorum* Stapf—F.T.A. 9: 125 ; Snowden in Kew Bull. 1935: 224. Widely distributed and cultivated in Gambia, Sierra Leone and French Guinea, and in N. Nigeria. In Kew Bull. l.c. Snowden recognises two varieties besides the typical form, var. *ovuliferum* Snowden, and var. *tremulans* Snowden, the former formerly *Andropogon Sorghum* subsp. *sativus* var. *ovulifer* Hack. in DC. Monogr. Phan. 6: 510 (1889) the latter the *Sorghum guineense* Stapf var. *tremulans* Stapf (in part) of F.T.A. 9: 124.
 8. *S. guineense* Stapf—F.T.A. 9: 123 (partly) ; Snowden in Kew Bull. 1935: 224. Widely distributed and cultivated throughout West Africa extending to the Eastern Sudan and Uganda. Snowden (l.c.) recognises six varieties, five of them in our area : (1) var. *involutum* Stapf (Nupe, *Bakie*) ; (2) var. *amphibolum* Snowden (*Andropogon Sorghum* var. *amphibolum* Buisse & Pilger in Engl. Bot. Jahrb. 32: 184) (Dahomey : Sokode, Kersting 19) ; (3) var. *intermedium* Snowden (*Andropogon Sorghum* var. *intermedium* Busse & Pilger l.c. 185) (Dahomey : Sokode, Kersting 5) ; (4) var. *pendulum* Snowden (*Andropogon Sorghum* var. *pendulum* Pilger in Notizbl. Bot. Gart. Berl. 4: 147) (Dahomey : Kersting) ; and (5) var. *scintillans* Snowden (N. Nigeria : Ilorin Road, 60 miles from Ibadan, Sampson 46).
 9. *S. mellitum* Snowden in Kew Bull. 1935: 225. *S. mellitum* var. *mellitum* Snowden l.c. N. Nigeria : Sokoto ! Exsicc.—Frampton per Glendon Hill 13.
 10. *S. gambicum* Snowden l.c. 229. *S. gambicum* var. *gambicum* Snowden l.c. Gambia ! Exsicc.—Dept. Agric. No. 11. Var. *celsum* Snowden l.c. 230. Sierra Leone : Koinadugu district ; north of Kabala ! Exsicc.—Glanville 338.
 11. *S. exsertum* Snowden l.c. 230. *S. exsertum* var. *exsertum* Snowden l.c. S. Nigeria : Ibadan ! Exsicc.—Farquharson Y. Var. *amplum* Snowden l.c. N. Nigeria : Sokoto, Emirate boundary to Gusau ! Exsicc.—Sampson.
 12. *S. membranaceum* Chiov. var. *Baldartianum* Chiov. in Monogr. Rapp. Colon. Rome, No. 19, Oct. 1912: 47. *S. papyraceum* var. *vesiculare* Stapf—F.T.A. 9: 134. N. Nigeria : Zaria ! Also in Eritrea and Sennar. Exsicc.—Glendon Hill F ; 42.
 13. *S. elegans* Snowden in Kew Bull. 1935: 238. *Andropogon Sorghum* var. *elegans* Koern. Var. *togoense* Snowden l.c. Togo ! Exsicc.—Kersting 15.
 14. *S. notabile* Snowden l.c. 239. *S. notabile* var. *notabile* Snowden l.c. N. Nigeria : Zaria ! Exsicc.—Glendon Hill K.
 15. *S. nigricans* Snowden var. *peruvianum* Snowden l.c. 244. N. Nigeria : Sokoto ! Kalkala ! Kundu-Kundu ! Exsicc.—Glendon Hill 5. *Golding C. Sampson*.
 16. *S. caudatum* Stapf—F.T.A. 9: 131. Var. *gibbum* Stapf l.c. N. Nigeria : Sokoto and Kano ! Kasuri Bano, Kwarre ! Near Lake Chad ! Exsicc.—Glendon Hill 4 ; 8 ; 29 ; 31. Sampson 28. Gwynn E ; F. Var. *feterita* Stapf l.c.



FIG. 375.—*Sorghum arundinaceum* Stapf (GRAMINEAE-ANDROPOGONEAE).
 A, stalked and stalkless spikelets. B, lower glume, and C, upper glume from stalkless
 spikelet. D, grain.

- N. Nigeria: Kano! Sokoto! Zaria! Near Lake Chad! Exsicc.—*Glendon Hill* 30; 41; and other collectors.
 Var. *Kerstingianum* Snowden l.c. 247.
 N. Nigeria: Kano! Zaria! Sokoto! Exsicc.—*Glendon Hill* 37, etc.
 Var. *colorans* Snowden l.c. 247.
 Togo! Kersting.
 17. *S. durra* Battand & Trab. Fl. Algér. 128 (1895); Stapf l.c. 129.
 Var. *niloticum* Snowden l.c. 249.
 N. Nigeria: Zaria, introd. from Bornu! Exsicc.—*Glendon Hill*.
 18. *S. cernuum* Host Gram. 4: 2, t. 3 (1809); Snowden l.c. 251.
 Var. *orbiculatum* Snowden l.c. 252.
 Gambla! Exsicc.—*Pirie* 97/33, etc.
 19. *S. trichopus* Stapf—F.T.A. 9: 141.
 French Guinea: Kouroussa! Bafing Valley! French Sudan: Middle Niger at Diarafabé! N. Nigeria: Nupe! Exsicc.—*Pobéguin* 507; 1731. *Barter* 1375.
 20. *S. bipennatum* Stapf—F.T.A. 9: 144.
 French Guinea: Kouroussa (Nov.—Dec.)! Sierra Leone: Dankawali! Gold Coast: Pong Tamale! N. Nigeria: Lokoja (Nov.)! Zaria! Also in Eastern Sudan, Cameroons to Angola. Exsicc.—*Pobéguin* 530. *Dalz.* 286. *Taylor* 15. *Glanville* 324. *Williams* 853. *Beal* 40.

101. CHRYSOPOGON Trin.—F.T.A. 9: 159.

Perennial; stems woody at the base, branched, branches forming fascicles of culms and short leafy branches; leaf-sheaths tight, terete, glabrous; ligule a ciliate rim; blades linear, tapered to a fine point, finely puberulous on both sides and often with pilose with weak hairs; panicle 5–10 cm. long, loose; branches in whorls, slender; sessile spikelet linear, about 6 mm. long; callus densely bearded, brown; glumes subequal; upper glume running out into a plumose awn as long to twice as long as the spikelet; pedicelled spikelet about as long as the sessile; glumes with plumose awns 1. *Aucheri* var. *quinqueplumis*

Perennial, probably introduced, with creeping stems with very close nodes bearing short leafy shoots and ending in 1–4 flowering culms; leaves glabrous except the ciliate margin, rounded at the base; panicle narrow and contracted, with short inconspicuous awns 2. *aciculatus*

1. *C. Aucheri* Stapf, var. *quinqueplumis* Stapf—F.T.A. 9: 160; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 860. Glaucous, woody at the base.
 Mauritania. Central Sudan: south of Air, at Tasolé. Also in N.E. tropical Africa south to Tanganyika Territory. Exsicc.—*Chev.* 43538 (not seen).
 2. *C. aciculatus* Trin. Fund. Agrost. 188; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 860. Panicle open when fresh, contracting on drying and purplish.
 S. Nigeria: Victoria, near tide level and mangrove swamps (July and Nov.)! Exsicc.—*Maitland* 16; 84; 152.
 Probably introduced; native of Eastern Tropics; according to Chevalier (l.c.), it is planted as a sand binder and naturalised at Bingerville, Ivory Coast.

102. VETIVERIA Thouars—F.T.A. 9: 156.

Sessile spikelets setulose-muricate more or less all over the outside; inflorescence a panicle of slender whorled racemes; racemes numerous (about 15–20) in each whorl, 10–15 cm. long; callus bearded; lower glume of sessile spikelet narrowly lanceolate, 6 mm. long, very acute; awns short and bristle-like, inconspicuous in the inflorescence; pedicels slender; leaf-sheaths crowded and arranged fan-like at the base of the culms, keeled, smooth; ligule a scarious rim; leaf-blades long, linear, smooth and closely nerved, margin slightly scabrid 1. *nigritana*
 Sessile spikelets smooth outside except near the apex and margins; inflorescence smaller than above and with fewer racemes in each whorl; awns long and very conspicuous in the inflorescence, spirally twisted; culms less stout than above, and leaves shorter 2. *fulvibarbis*

1. *V. nigritana* Stapf—F.T.A. 9: 157; Holl. 806. *Andropogon squarrosus* var. *nigritanus* Hack.—Chev. Bot. 720, and Rev. Bot. Appl. Agric. Trop. 1933: 858.
 From Senegal and French Sudan to Nigeria, and throughout tropical Africa, mostly growing in clumps near water or in plains subject to floods; usually 4–8 ft. high. (See Appendix).
 2. *V. fulvibarbis* Stapf—F.T.A. 9: 158; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 860. *Andropogon fulvibarbis* Trin.—Chev. Bot. 717. A swamp grass up to 6 ft. high.
 French Sudan: Sansanding (Sept.). San (Sept.)! Senegal: Mbouhou (Dec.). Tamboukhané (Dec.). Gold Coast: Accra Plains (Feb.—Mar.)! Christianborg (Apr.)! Black Volta R. banks, at Bjury, Ashanti (July)! Exsicc.—*Chev.* 2342. *Vogel.* *Dalz.* 8429. *Deighton* 593. *Irvine* 254. *Johnson* 1027. *Chipp* 507. (See Appendix).
V. zizanioides Stapf—Holl. 4: 806, a native of India and Ceylon is introduced. (See Appendix).

103. BOTHRIOCHLOA O. Kuntze Rev. Gen. 762 (1891) (*Amphilophis* Nash—F.T.A. 9: 171).

Primary axis much longer than the lowest racemes, the inflorescence more or less triangular in outline; leaf-blades linear, long-tapering to a setaceous point, pale green, at length often reddish or purplish; lower glume of sessile spikelet with a pit above the middle. 1. *glabra*

Primary axis comparatively short, much overtopped by the racemes, the inflorescence more or less obovate in outline; other characters more or less as above
 2. *intermedia* var. *acidula*

1. *B. glabra* A. Camus in Ann. Soc. Linn. Lyon 1930, n.s. 76: 164 (1931). *Amphilophis glabra* Stapf—F.T.A. 9: 172; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 861; Holl. 808. A fragrant perennial grass with tufted culms to over 3 ft. high.
Senegal: Ngazobil (*Chevalier*). N. Nigeria: Katagum district! Extends to N.E. Australia and Madagascar. Exsicc.—Dolz. 257.
2. *B. intermedia* A. Camus var. *acidula* C. E. Hubbard in Kew Bull. 1934: 109. *Amphilophis intermedia* Stapf var. *acidula* Stapf—F.T.A. 9: 174; Holl. 808. A perennial with erect culms up to over 3 ft. high.
Gold Coast: Christiansborg (Mar.)! Also in Angola, Cape Verde, and West Indies. Exsicc.—Johnson 1017.

104. DICHANTHIUM Willemet—F.T.A. 9: 177.

- Lower glume of sessile hermaphrodite spikelets without a semi-lunar row of long tubercle-based hairs below the hyaline tip; leaf-blade margins not revolute, tapered to a fine point, glaucous; inflorescence subdigitate; racemes 3-9; sessile spikelets 3-4 mm. long 1. *annulatum*
- Lower glume of sessile hermaphrodite spikelets with a semi-lunar row of long tubercle-based hairs below the hyaline tip; leaf-blade margins at length revolute; racemes 3-5; sessile spikelets 4-5 mm. long 2. *papillosum*
1. *D. annulatum* Stapf—F.T.A. 9: 178; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 861. A densely tufted perennial; culms up to 3 ft. high, bearded at the nodes; racemes appearing slightly pubescent, pale or flushed with purple.
Mauritania and Afr. From Morocco through North Africa to India and China, and Australia; in East Africa from Eastern Sudan to Portuguese East Africa. Exsicc.—Chev. 2986; 43539 (not seen). (See Appendix).
2. *D. papillosum* Stapf—F.T.A. 9: 179; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 861. As above, densely villous at the nodes; racemes appearing rather densely and softly pilose, purplish-grey.
Southern Sahara: Tin Zaouaten, in Iforas-Adrar. Also in N.E. tropical Africa and Angola. Exsicc.—Fronteau 10 (not seen).

105. EUCLASTA Franch.—F.T.A. 9: 180.

- Annual; culms up to nearly 2 m. high, slender, nodes bearded; leaf-sheaths glabrous or slightly hairy; ligule short, ciliate; leaf-blades linear, tapered to a fine point, 15-25 cm. long, up to 1 cm. broad, pilose below, nearly glabrous above, but with a few very long bristle-like hairs near the base, margins scabrid; panicle umbelliform, pilose, composed of several (up to 15) nodding racemes 5-8 cm. long, with very long twisted hairy awns; axis of panicle long-pilose at the nodes; lower glume of sessile spikelet oblong-lanceolate, 5 mm. long, strongly nerved, pilose towards the base; awn of lower floret 3-4 cm. long *condylotricha*
- E. *condylotricha* Stapf—F.T.A. 9: 181; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 861. *Andropogon condylotrichus* Hochst.—Chev. Bot. 717.
French Sudan: Koulikoro (Oct.)! Timbo, rather common (Oct.)! Togo: Ho (Dec.)! N. Nigeria: Lokoja! Abinsi (Oct.)! Bauchi Plateau! S. Nigeria: Ibadan! Through the Ubangi Region to the Eastern Sudan and Nubia, Zanzibar, and Congo Region to Angola; also in tropical America. Exsicc.—Chev. 2346. Pobéguin 1775. Hoives 1041. Dolz. 887. Lely 794. Barter. Deighton 549.

106. EREMOPOGON Stapf—F.T.A. 9: 182.

- Perennial, densely tufted; culms very slender, about 3-noded; basal leaf-sheaths whitish and thin; ligule hyaline, ciliolate, continuous with the membranous margins of the sheath; blades linear, acute, up to 8 cm. long and 2 mm. broad, glaucous; inflorescence a solitary silky raceme, 3-4 cm. long, supported by a bladeless spathe-like sheath; peduncles filiform, at length exserted; sessile spikelet lanceolate, 4 mm. long, pale and shining with reddish tips; glumes equal, glabrous; intracarpinal nerves of lower glume 2, with a circular pit between them above the middle; upper glume 3-nerved, ciliolate; lemma reduced to an awn up to 2 cm. long *foveolatus*
- E. *foveolatus* Stapf—F.T.A. 9: 183; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 861. Forms a dense cushion-like much grazed plant; culms up to 2 ft. high, with solitary or fascicled flowering branches.
Mauritania and Afr. Ten miles north of Abelessa, 3,300 ft. (Mar.)! From the Cape Verde Islands across N. Africa to Arabia and India; also in the more arid parts of N.E. tropical Africa. Exsicc.—Chev. 42987. Chipp 39; 42; 46. (See Appendix).

107. SCHIZACHYRIUM Nees—F.T.A. 9: 184.

- Fertile valve of sessile spikelets 2-lobed to beyond the middle:
Leaf-blades linear, obtuse to shortly acute at the apex:
Leaf-blades up to 3 mm. broad; culms very delicate, much-branched from below; spathes very narrow, reaching to the base of the racemes, 1-1.5 cm. long, acute; racemes slender, 1-2.5 cm. long; sessile spikelets linear-lanceolate, acuminate; glumes equal, lower 2-dentate, smooth or finely scaberrulous on the back; awns very slender, 8-12 mm. long 1. *brevifolium*
- Leaf-blades broader, about 6-8 mm. broad; culms rather stout, little-branched; spathes mostly embracing the base of the racemes, about 2 cm. long; sessile spikelets linear-lanceolate; glumes equal, lower 2-dentate or truncate; awns filiform, twisted, about 8 mm. long 2. *platyphyllum*
- Leaf-blades gradually tapered to a very fine point at the apex:
Annuals:
Racemes subsessile in the spathe, the latter about as long as the racemes, becoming

red; leaf-sheaths loose, glabrous; leaf-blades turning red, glabrous or with long fine hairs towards the junction with the sheath; glumes of sessile spikelet equal, the lower produced into a narrow 2-dentate acumen, with long white hairs on the back to beyond the middle; awns brown below, white above, 1-2 cm. long

3. *exile*

Racemes pedunculate in the spathe:

Racemes very slender, on slender peduncles; sessile spikelets less than 4 mm. long, glabrous except for the bearded callus; leaf-sheaths tight, glabrous; ligule truncate, glabrous; leaf-blades narrowly linear, up to 7 cm. long; spathe very narrow, tight, 2.5-4 cm. long, reddish; peduncles at length long-exserted, thickened at the cupular tips after the fall of the raceme; awns up to 1.5 cm. long, white in the upper half 4. *delicatum*

Racemes stouter; sessile spikelets over 5 mm. long:

Spathe embracing the lower part of the raceme, the latter interruptedly and densely silvery-villous, 2-4 cm. long; leaf-blades linear, 2-3 mm. broad, with scattered long fine hairs towards the base; awn about 1 cm. long, the lower half brown, the upper part white 5. *nodulosum*

Spathe not embracing the raceme, the latter long-pedunculate and exserted, more or less uniformly pubescent, 4-7 cm. long; leaf-blades about 5 mm. broad, glabrous or sparingly pubescent; awns as above 6. *griseum*

Perennials; lower glume of sessile spikelets much rounded on the back, sub-coriaceous, glabrous, very obscurely nerved, 6-7 mm. long; racemes on peduncles almost entirely enclosed in the spathe, up to 7 cm. long, 8-14-jointed; awn 14-16 mm. long, with a dark column and whitish bristle 7. *semiberbe*

Fertile valve of sessile spikelets shortly 2-fid to entire:

Culms not suffrutescent, simple:

Sessile spikelets close, twice as long as the joints; column of awn long-exserted; racemes nearly glabrous, 4-5 cm. long, with slender peduncles well exserted from the spathe; leaf-blades narrowly linear, up to 20 cm. long, about 3 mm. broad 8. *Schweinfurthii*

Sessile spikelets distant, about as long as the joints; racemes distinctly hairy:

Flowering branches distant, very long and slender; racemes not plumose:

Perennials; spikelets lanceolate, 6-8 mm. long; awn 14-16 mm. long, kneed and twisted below the middle; racemes 5-6 cm. long, silky 9. *compressum*

Annuals; culms very slender; racemes about 2 cm. long, on slender peduncles; awn 12-16 mm. long, kneed and twisted below the middle 10. *scintillans*

Flowering branches collected into a terminal bunch; racemes about 3 cm. long, plumose from the long hairs on the joints and pedicels; fertile valve of sessile spikelets entire; leaf-sheaths very tight, glaucescent, the upper ones spathe-like; blades spreading, up to 5 cm. long, glabrous 11. *pulchellum*

Culms suffrutescent or wiry, with numerous barren branches below the flowering ones; hairs of joints and pedicels short; racemes about 2 cm. long, slender, 6-7-jointed; leaves very narrow, tapered to a fine point, up to 15 cm. long, glabrous except for a few hairs at the base 12. *rupestre*

1. *Schizachyrium brevifolium* Nees—F.T.A. 9: 187; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 862. Much-branched slender annual up to 2 ft. high, sometimes rooting at the lower nodes.

French Sudan: Koulikoro (Sept.)! French Guinea: Kouroussa (Oct.)! Bamako (Jan.)! Timbo (Oct.)! Baffing Valley (Nov.)! Sierra Leone: various localities (Oct.-Jan.)! N. Nigeria: Bauchi Plateau! S. Nigeria: without localities! Widely distributed in the tropics. Exsicc.—Chev. 205; 2350; 25019. *Pobéguin* 522; 1702; 1793; 1811. *Glanville* 65. *Deighton* 259; 335; 831; 924; 998. *Thomas* 5699. *Barter*. *Lely* 791. *Thomas* 1072.

2. *S. platyphyllum* Stapf—F.T.A. 9: 188; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 862. Creeping at the base and rooting at the lower nodes, up to 3 ft. high, often forming small clumps.

French Guinea: Baffing Valley (Oct.)! Sierra Leone: Yeraia (Apr.)! Mano Salija (Nov.)! Extends to French and Belgian Congos. Exsicc.—*Pobéguin* 1800. *Glanville* 205. *Deighton* 343. (See Appendix).

3. *S. exile* Stapf—F.T.A. 9: 191; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 862; Holl. 809. Annual rooting at the lower nodes, up to 2 ft. high.

French Sudan: Ansongo (Sept.)! Gold Coast: N. Nigeria: Katagum! Lokoja (Oct.)! Sokoto! Extends to Eastern Sudan and in India. Exsicc.—*Hagerup* 392. *Beal* 8. *Dalz.* 259; 279; 491. *Moiser* 140; 142. (See Appendix).

4. *S. delicatum* Stapf—F.T.A. 9: 190; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 862. Very slender erect annual about a foot high.

French Guinea: Timbo (Oct.)! Exsicc.—*Pobéguin* 1791.

5. *S. nodulosum* Stapf—F.T.A. 9: 193; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 862. Erect annual $1\frac{1}{2}$ ft. high, with erect racemes clothed with tufts of long soft hairs.

Senegal! French Guinea: Koulikoro (Oct.)! S. Nigeria: Abo! Exsicc.—*Heudelot* 303. *Chev.* 2401. *Barter* 371.

6. *S. griseum* Stapf—F.T.A. 9: 194; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 862. Culms erect, sparingly branched.

French Guinea: Baffing Valley (Nov.)! Kindia. Exsicc.—*Pobéguin* 1774.

7. *S. semiberbe* Nees—F.T.A. 9: 195; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 863. A water-side grass up to 10 ft. high; culms purplish.

French Sudan: Segou (Sept.)! Gold Coast: Accra Plains (Mar.)! Takoradi (Oct.)! Togo! N. Nigeria: Nupe! Abinsi (July)! Extends through the Congo to East Africa, Rhodesia and Angola. Exsicc.—*Chev.* 2354. *Brown* 428. *Howes* 982; 1141. *Beale* 43; 50. *Baumann* 352. *Barter* 1300. *Dalz.* 869. (See Appendix).

8. *S. Schweinfurthii* Stapf—F.T.A. 9: 199. Culms bright straw-coloured, shining, over 2 ft. high. N. Nigeria: Lokoja (Oct.)! Also in Jurland. Exsicc.—*Dalz.* 289.

9. *S. compressum* Stapf—F.T.A. 9: 201; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 863. Perennial, compactly caespitose; roots stout, blackish; racemes embraced by the spathe at the base. French Sudan: Morigueyo (Feb.)! Senegal: Sindiore (Jan.)! Also in the Shari district. Exsicc.—Chev. 435: 2348.
10. *S. scintillans* Stapf—F.T.A. 9: 202; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 863. Tufted, about 1 ft. high; culms very slender, nodes exerted; racemes short, at length partially exerted from the spathe. French Guinea: Futa Jallon; between Soumbakalo and Boulivel! Sierra Leone: Brookfields, barer rock on flats (Oct.)! Exsicc.—Chev. 18664. Deighton 2175.
11. *S. pulchellum* Stapf—F.T.A. 9: 203; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 863. Creeping, very stiff, inflorescence not erect; spathes more or less tinged with mauve. Senegal: Niayes (Dec.)! Gambia! Sierra Leone: Lumley Beach, at and just behind high water mark (Dec.)! Mano Salija, sandy beach (Nov.)! S. Nigeria: Lagos, creeping on sandy seashore (Dec.)! Also in the Lower Congo. Exsicc.—Chev. 2366. Beauvais. Deighton 347; 789. Dalz. 1325.
12. *S. rupestre* Stapf—F.T.A. 9: 204. Togo: in fissures of rocks on the Agome Mts., near Misahöhe! Exsicc.—Baumann 361.

108. *DICTOMIS* Kunth—F.T.A. 9: 206.

Annual; culms up to about 1 m. high, slender, much branched, nodes glabrous; leaf-sheaths glabrous; ligule large, linear-lanceolate, acute, 6–10 mm. long, nerved, glabrous; leaf-blades narrowly linear, tapered to a fine setaceous point, up to 30 cm. long, minutely papillous-scabrid on both surfaces; inflorescence a fastigiate panicle; branches of panicle bearing a usually solitary raceme for some time invested by a reddish-brown linear-lanceolate very acute spathe; peduncles slender; racemes 3–4 cm. long, with numerous long twisted awns; joints of rachis 2-toothed at the top, the margins very long-villous-ciliate; sessile spikelet between the rachis and pedicellate spikelet; awn up to 5 cm. long; lower glume of pedicellate spikelet conspicuous, purplish, obliquely obovate-oblong, nearly 1 cm. long, minutely ciliate, many-nerved and ending in a long fine bristle between the much shorter mucros

fastigiate

- D. fastigiate* Kunth in Humb. & Bonpl. Nov. Gen. & Spec. 1: 193, t. 64.—F.T.A. 9: 207; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 863. French Sudan: Yatenga. French Guinea: very common and the principal grass of the plateaux. Timbo, etc. (Oct.–Nov.)! Gold Coast! N. Nigeria: Lokoja (Nov.)! Abini (Dec.)! Bauchi Plateau! Eastern Sudan and Abyssinia, Rhodesia and Angola. Common in the tropics generally. Exsicc.—Hagerup 500. Pobéguin 1781; 1814. Beal 25. Dalz. 283; 894. Lely 796. (See Appendix).

109. *ANDROPOGON* Linn.—F.T.A. 9: 208. (See Appendix).

Joints and pedicels linear to finely filiform:

Culms simple or very sparingly branched upwards; racemes usually paired, dense; joints and pedicels linear, straight; lower glume more or less lanceolate to oblong and flat on the back with frequently winged keels and several rather evenly distributed intracarpal nerves, one of them usually median; upper glume aristulate from a minute notch; valvule 0 or very minute:

Leaf-blades long and very narrow, under 2 mm. broad, with a relatively stout midrib and narrow revolute herbaceous sides; plants compactly caespitose with intravaginal innovations; racemes up to 12 cm. long; sessile spikelets 9 mm. long; intracarpal nerves 2 on each side, close to the keels, without a middle nerve in the sessile, but with a middle nerve in the pedicelled spikelets . . . 1. *Lima*

Leaf-blades usually over 2 mm. broad, with a very slender midrib:

Sessile spikelets 6–11 mm. long; lower glume more or less winged at the keels:

Perennials; sessile spikelets 9–11 mm. long; cataphylls of innovation-buds more or less hairy to villous; racemes 2, subequal, 4–7 cm. long . . . 2. *distachyus*

Annuals; racemes 3–5 cm. long, densely white-villous; joints hairy on the back and sides . . . 3. *abyssinicus*

Sessile spikelets 5–6 mm. long; lower glume wingless; racemes usually 3, digitate, 4–6 cm. long, unequal, not villous; lower glume of hermaphrodite spikelet glabrous; leaves acute . . . 4. *Mannii*

Culms simple to much branched upwards or branched all along; racemes paired or in corymbs or corymboid panicles, loose to very loose; joints and pedicels filiform to finely filiform and then often curved; lower glume narrow; keels wingless, and without or with only 2 delicate intracarpal nerves; upper glume acute, rarely produced into a minute mucro or small bristle; valvule present, rather small:

Racemes 3–15, in corymbs or corymbose panicles:

Racemes plumose, hairs of joints and pedicels silvery, several times as long as them; sessile spikelets 2–3 mm. long, awnless . . . 5. *leucostachyus*

Racemes not plumose, up to 4 cm. long, on erect straight peduncles; hairs of joints and pedicels much shorter than them; culms bamboo-like, with very broad sheaths; leaf-blades linear, long-tapered to a fine point, spinulously ciliate; inflorescence a long narrow interrupted spatheate panicle of usually 4–5-rayed distant tiers . . . 6. *calvescens*

Racemes 2-nate, about 4 cm. long; flowering branches few; hairs of joints and pedicels very short; leaves linear, with very fine spreading long hairs towards the base . . . 7. *linearis*

Joints and pedicels distinctly swollen upwards, clavate or cuneate; valvule always present, distinct:

Lower glume of spikelets laterally compressed, wedged in between joint and pedicel, its back narrow, deeply grooved, the keels often approaching over the groove; upper glume acute or produced into a mucro or small bristle:

Racemes 2-nate:

Annual; raceme pairs in much-branched spathaceous panicles, usually exerted laterally or subterminally from the spathes, rather loose and delicate; awn relatively long and conspicuous; upper glume of sessile and lower of pedicelled spikelet with a bristle-like awn 10–12 mm. long 8. *pseudapricus*

Perennial:

Leaf-blades broad and rounded to cordate and more or less amplexicaul at the base, up to 25 cm. long, 2–3 cm. broad at the base, tapered to a sharp apex; inflorescence a scanty panicle of 2-rayed tiers of racemes 3–4 cm. long 9. *amplectens* var. *diversifolius*

Leaf-blades narrowed towards the base:

Lower glume of sessile spikelets deeply grooved between the keels:

Joints and pedicels long, and densely ciliate; racemes dense, markedly dorsiventral, subequal, up to 15 cm. long 10. *schirensis*

Joints and pedicels shortly ciliate or almost or quite glabrous:

Sheath-auricles and ligules up to 12 mm. long; leaf-blades rigid, to over 30 cm. by 4 mm., softly pilose on the upper surface; glumes not distinctly aristulate; racemes paired, about 6 cm. long, at length exerted from the spathe-like upper sheath 11. *perligulatus*

Sheath-auricles and ligules up to 3 mm. long; culms simple, very slender; leaf-blades up to 10 cm. long, 1–2 mm. broad; racemes subequal, about 6 cm. long; glumes distinctly aristulate 12. *canaliculatus*

Lower glume of sessile spikelet concave on the back with the keels distant; joints and pedicels stout, clavate, shortly ciliate; culms sparingly branched from the upper nodes; ligules subtruncate, scarious, 1.5 mm. long; leaves and spathes tapered to filiform points; racemes 4 cm. long 13. *pinguipes*

Racemes solitary, 4 cm. long; sessile spikelets 4 mm. long; upper glume without a terminal bristle; leaf-blades flat, midrib very slender; culm with appressed barren branches almost all along 14. *Macloediae*

Lower glume of spikelets dorsally flattened, only the upper glume wedged in, its back with a shallow median groove; upper glume neither mucronate nor aristulate; coarse often tall grasses:

Leaf-blades rather thin, lanceolate, especially the lower ones narrowed at the base into a false petiole; spatheate panicle very large, decompound; racemes 2.5–4 cm. long, softly villous; joints and pedicels linear, slightly widened at the tips, sub-transparent; sessile spikelets 5 mm. long; culms hard and bamboo-like 15. *tectorum*

Leaf-blades more or less firm:

Leaf-blades rarely over 1.6 cm. broad:

Mouth of leaf-sheaths produced laterally into long acute lanceolate auricles at first adnate to the longer ligule and up to 1 cm. long; leaf-blades up to 8 mm. broad, much narrowed to the base; awns 12–14 mm. long, kneed at and twisted below the middle 16. *auriculatus*

Mouth of the leaf-sheaths forming rounded shoulders or only slightly produced and adnate to the short ligule:

Spikelets 5–6 mm. long; joints and pedicels shortly ciliate; awns very slender, up to 12 mm. only 17. *gabonensis*

Spikelets 6–8 mm. long; joints and pedicels villous-ciliate on one or both sides; awns usually 1.5–3 cm. long 18. *Gayanus*

Leaf-blades very large, up to 0.75 m. long and 4 cm. broad, usually broad at the base and gradually passing into the sheath, very firm and rigid; joints and pedicels linear 19. *macrophyllus*

1. *Andropogon Lima* Stapf—F.T.A. 9: 217. Perennial about 3½ ft. high, with pairs of racemes slightly unequal in length.
Cameroons Mt.: 9,000 ft. edge of forest and grassland (Dec.-Feb.)! Exsicc.—Mann 2084. Maitland 1041; 1340. *Mildbr.* 10856.
2. *A. distachyus* Linn.—F.T.A. 9: 218. Perennial 1–2½ ft. with usually paired subequal rather short racemes.
Cameroons Mt.: 7,000–8,000 ft. (Dec.-Feb.)! Also in East and South Africa, and widely distributed from the Canaries and S. Europe to tropical Arabia. Exsicc.—Mann 1345; 2078. Maitland 1035. *Steele* 101.
3. *A. abyssinicus* R.Br.—F.T.A. 9: 222. Loosely tufted annual up to 2 ft.
Cameroons Mt.: 9,000–11,000 ft. (Nov.)! Also in Abyssinia. Exsicc.—Maitland. Migeod 170.
4. *A. Mannii* Hook. f.—F.T.A. 9: 226. Densely tufted perennial about 1–1½ ft. high.
Cameroons Mt.: 10,000 ft. (Dec.-Jan.)! Fernando Po: 9,000 ft. (Dec.)! Exsicc.—Mann 654. Maitland 1271. *Mildbr.* 10892.
5. *A. leucostachyus* H.B. & K.—F.T.A. 9: 229. Densely tufted perennial with long silky racemes.
Senegal. Tropical and subtropical America. Exsicc.—Leprieux. Perrotet 1828.
6. *A. calvescens* Stapf—F.T.A. 9: 232. Tufted up to 7 ft. with downy reddish-purple racemes.
Sierra Leone: Dankwall, 1,200 ft. (Nov.)! French Guinea: Baffing Valley (Oct.)! Exsicc.—Glanville 323. *Pobéguin* 1802.



FIG. 376.—*ANDROPOGON SCHIRENSIS* Hochst. (GRAMINEAE-ANDROPOGONEAE).
 A, ligule. B, C, pairs of spikelets. B₁, C₁, joints of racemes. B₂, C₂, stalkless spikelet.
 B₃, C₃, stalk of stalked spikelet. B₄, C₄, stalked spikelet.

7. *A. linearis* Stapf—F.T.A. 9: 239. Erect perennial up to 3 ft. high.
French Guinea: Futa Jallon; Bafing Valley (Oct.)! N. Nigeria: Bauchi Plateau (Sept.) Vodni!
Exsicc.—Chev. 18666. *Pobéguin* 1787. *Lely* P. 758. *Saunders* 31; 44.
8. *A. pseudapricus* Stapf—F.T.A. 9: 242; Holl. 809.
Gambia and French Guinea to N. Nigeria, extending to Nyasaland and Belgian Congo. Exsicc.—*Pobéguin* 516; 518; 1781b; 1782; 1783; 1783b; 1785. *Bardou* 24. *Chev.* 2347. *Dalz.* 284; 287; 490; 490a; 8414. *Barter* 936.
9. *A. amplexens* Nees, var. *diversifolius* Stapf—F.T.A. 9: 244.
French Guinea: Timbo (Oct.)! Kindia! Ahirat (Nov.)! The typical forms from Abyssinia, Rhodesia, Angola, and in S. Africa; the var. also in Angola. Exsicc.—*Pobéguin* 1779. *Chev.* 187; 33830.
10. *A. schreineri* Hochst.—F.T.A. 9: 246. Tall, 7–8 ft. high with paired reddish-brown racemes.
French Guinea: Kouroussa (Aug.–Sept.)! Timbo (Oct.)! Futa Jallon! Sierra Leone: Mamaha (Jan.)! Bintumane, plentiful on slopes between 3,000–5,000 ft.! Gold Coast: savannah at foot of Krobo Hill (Nov.)! S. Nigeria: Lagos! Ogoja Province! N. Nigeria: Bauchi Plateau (Sept.)! Vodni! Jeba! Lokoja, on ridge of Mt. Pati (Oct.)! Abinsi (Sept.)! Tropical Africa generally. Exsicc.—*Pobéguin* 503; 509; 1780. *Chev.* 18446. *Glanville* 333. *Irvine* 1708. *Lely* P. 766. *Dalz.* 290; 906.
11. *A. periglutatus* Stapf—F.T.A. 9: 250. Perennial to over 3 ft. high, recognised at once by the very large foliaceous auricles at the apex of the leaf-sheaths.
Sierra Leone: Batkanu (Jan.)! Togo: Misahöhe! N. Nigeria: Abinsi! Exsicc.—*Glanville* 126. *Baumann* 318. *Dalz.* 906a.
12. *A. canaliculatus* Schum.—F.T.A. 9: 251, incl. var. *fastigiatus* Stapf.
French Guinea: Kouroussa! Timbo (Oct.)! San (Sept.)! Gold Coast: various localities! Also in East Africa and the Belgian Congo. Exsicc.—*Pobéguin* 513; 1776. *Chev.* 2349. *Johnson* 1030. *Irvine* 827; 1019; 1632; 1635. *Williams* 838.
13. *A. pinguipes* Stapf—F.T.A. 9: 254.
Senegal: M'Bidjem! Exsicc.—*Thierry* 92.
14. *A. Macleodias* Stapf—F.T.A. 9: 256.
N. Nigeria: Ilah, on the Niger! Exsicc.—*Miss Macleod*.
15. *A. tectorum* Schum.—F.T.A. 9: 257; Holl. 810. Up to 20 ft. high, bamboo-like.
French Guinea, Sierra Leone, Togo, N. and S. Nigeria, and in Ubangi! Often occupying many square miles of country.
16. *A. auriculatus* Stapf—F.T.A. 9: 258. Up to 5 ft., tufted.
Senegal! Sierra Leone: Sherbro Island! Mano Sallja (Dec.)! Yoni, Bonthe Island (Mar.)! S. Nigeria: Nun River (Sept.)! Also in French Cameroons. Exsicc.—*Farnar* 45; 167. *Deighton* 284; 2480. *Mann* 533.
17. *A. gabonensis* Stapf—F.T.A. 9: 260. Up to 8 ft.
Sierra Leone: Newton (Nov.)! Mangara (Jan.)! Also in Gabon, Portuguese and Belgian Congo. Exsicc.—*Deighton* 1469. *Glanville* 395.
18. *A. Gayanus* Kunth—F.T.A. 9: 261; Holl. 809. A widely spread and polymorphic species arranged by Stapf into three varieties, all of which occur within the area of this Flora as follows:
Var. *genuinus* Hack. Joints and pedicels hairy on one side only, the racemes then glabrous on the side exhibiting the lower glumes of the sessile spikelets or only hairy from the calli; callus-beard scanty and usually confined to the sides; awn mostly 1–2 cm. long; pedicelled spikelets glabrous.
Var. *squamulatus* Stapf. Joints and pedicels ciliate on both margins, the racemes then more or less villous on both sides; callus beard usually rather dense, frontal and lateral; awn usually 2–3 cm. long; pedicelled spikelets scabrous to puberulous.
Var. *bisquamulatus* Hack. Joints and pedicels ciliate on one or both margins; callus-beard rather dense, front and lateral; awn up to 2.5 cm. long; pedicelled spikelets more or less hairy to villous.
19. *A. macrophyllus* Stapf—F.T.A. 9: 264. Culms very stout and bamboo like.
S. Nigeria: Lagos! Exsicc.—*MacGregor* 248.

110. CYMBOPOGON Spreng.—F.T.A. 9: 265. (See Appendix).

Innovations intravaginal, the culms arising from dense bunches of firm persistent leaf-sheaths and innovations:

Fertile spikelets awned; keels of the lower glume of the fertile spikelets not winged upwards:

Blades filiform, 1 mm. in diameter, semiterete, with narrow herbaceous margins; rays mostly simple, the panicle rather scanty 1. *Schoenanthus*

Blades folded or flat, up to 2 mm. wide, midrib very slender; most tiers of inflorescence with compound or decompound rays, the panicle rich and more or less dense 2. *proximus*

Fertile spikelets awnless; leaves in dense fascicles from a short annulate rhizome; basal sheaths wide below, cinnamon-coloured on the inner side, up to 30 cm. long, bearing blades up to 1 m. long and 2 cm. broad 3. *citratius*

Innovations extravaginal, arising from a short rhizome; panicle frequently over 30 cm. long, decompound; blades up to over 2.5 cm. wide at the base; joints and pedicels densely ciliate; base and near pedicel of sessile raceme connate; oil-streaks confined to the upper $\frac{1}{2}$ or $\frac{1}{4}$ of the lower glume of the sessile spikelets 4. *giganteus*

1. *C. Schoenanthus* Spreng.—F.T.A. 9: 268; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 871; Holl. 813.
French Sudan: Ausongo (Sept.)! Central Sahara: Tamanrasset, 5,100 ft. (Feb.)! Taharanent, 5,900 ft. (Mar.)! Ten miles north of Ablessea, 3,300 ft. (Mar.)! Throughout N. Africa, from Morocco to Arabia and Mesopotamia and to Western India. Exsicc.—*Hagerup* 330. *Meinertzhagen* 201; 213. *Chipp* 37.

2. *C. proximus* Stapf—F.T.A. 9: 271; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 871; Holl. 813.
French Guinea: numerous localities! Gold Coast: Tong Hills, in small isolated clumps (July)! Tamale (June)! N. Nigeria: Mongoun, etc.! Sokoto (July)! Also in N.E. tropical Africa. Exsicc.—*Chev.* 614; 24075; 43042; 43146. *Rogee* 433. *Leclercq* 42695. *Lean* 83. *Williams* 520. *Bunting* 4; 11. *Golding* 4. *Dalz.* 486.

3. *C. citratius* Stapf—F.T.A. 9: 282; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 872; Holl. 810.
Cultivated; widely planted along roads and in native gardens in Sierra Leone and elsewhere; native probably of India.

A. Nardus Rendle, closely allied to *C. citratius*, is also cultivated at Aburi, Gold Coast.

4. *C. giganteus* Chiov.—F.T.A. 9: 288; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 871; Holl. 811. Perennial up to 8 ft. high, with large narrow dense panicles.
Senegal to N. and S. Nigeria, extending to the Eastern Sudan, Portuguese East Africa and Nyasaland. Exsicc.—*Thierry* 93. *Hagerup* 402. *Chev.* 33911. *Dave* 11. *Johnson* 756. *Bunting* 8. *Warnecke* 402. *Dawodu* 164. *Dalz.* 239; 485; 8415. *Lely* 769.

111. DIHETEROPOGON Stapf in Hook. Ic. Pl. t. 3093 (1922).

Leaf-blades not cordate at the base; culms erect, simple, few-noded, terete, glabrous; nodes exserted; ligule rounded-truncate; leaf-blades linear from a slightly contracted base, up to 25 cm. long and 1 cm. broad, setulose-scabrid on the margin towards the base; racemes paired, one sessile the other shortly pedunculate, up to 13 cm. long; 3-9 pairs of lower spikelets, homogamous and male or neuter, one sessile, the other pedicellate; glumes of pedicelled spikelet oblong-elliptic, 2 cm. long, glabrous; awns 9-11 cm. long, hairy in the upper part 1. *grandiflorus*

Leaf-blades rounded-cordate at the base, semiamplexicaul, tapered to a long fine point, up to 2.5 cm. broad at the base; racemes paired, up to 5 cm. long, one sessile, the other pedunculate; sessile raceme with a pair of sterile spikelets at the base and the rest heterogamous 2. *Hagerupii*

1. *D. grandiflorus* Stapf l.c. t. 3093. About 6 ft. high with narrow-based leaves and paired racemes tinged with mauve-purple.

N. Nigeria: Nupe, open plains! Exsicc.—Barter 1373.

2. *D. Hagerupii* Hitchcock in Proc. Biol. Soc. Wash. 43: 89 (1930); Chev. Rev. Bot. Appl. Agric. Trop. 1933: 870. Tall grass 4-6 ft. with broad-based stem-clasping leaves.

French Sudan: Bara, near Ansongo (Sept.)! N. Nigeria: Sokoto! Katagum! Exsicc.—Hagerup 401. *Dalz.* 267; 489.

112. HYPARRHENIA Anderss.—F.T.A. 9: 291. (See Appendix).

Lower glume of fertile spikelet not pitted:

Raceme-bases unequal, that of the lower raceme usually very short, the upper 2-10 mm. long, filiform, slender:

Raceme-bases not produced into a long bract-like appendage at the insertion of the lowest fertile spikelet:

Upper raceme with or without 1 pair of homogamous awnless male or neuter spikelets:

Hairs of the racemes fulvous or rufous throughout or mostly so:

Tall coarse grasses, 2 m. or more high:

Racemes dense, not long and densely villous; spikelets rufous and slightly glossy 1. *rufa*

Racemes loose, mostly densely rufous-villous:

Raceme-pairs 7-11-awned, golden- or greyish-fulvous; upper raceme with 2 homogamous male pairs of spikelets at the base; mature peduncles exceeding the spatheoles; perennials 2. *poecilotricha*

Raceme-pairs 11-13-awned, densely rufous-villous; upper raceme without a homogamous pair at the base; mature peduncles equalling or exceeding the spatheoles; annuals 3. *chrysargyreia*

Short, compactly caespitose grasses, rarely up to 1 m. high; raceme-pairs 2-5-3.5 cm. long, contiguous (not reflexed), stout, rufously fulvous; leaf-blades 3-5 mm. wide, linear from a gradually narrowed base, tapered to an acute point, pale green 4. *Smithiana*

Hairs of the racemes white throughout:

Perennial, densely tufted; leaf-blades usually glaucous, 1.5-3 mm. wide; racemes not reflexed 5. *hirta*

Annual; leaf-blades not glaucous, broader than above; racemes conspicuously reflexed, tinged with violet, arranged in lax panicles, with long awns

6. *soluta* var. *violascens*

Upper raceme with 2 pairs of homogamous awnless male or neuter spikelets persistent on the tardily disarticulating raceme-bases:

Annual; spikelets glabrous; awns 2 per raceme-pair, subplumose, their hairs up to 4 mm. long 7. *Barteri*

Perennial; spikelets glabrous or nearly so; awns 2-3 per raceme-pair, shortly hirtellous 8. *filipendula*

Raceme-bases produced into a long scarious bract-like appendage at the insertion of the lowest fertile spikelet, the appendage appressed to the latter; racemes not reflexed, up to 2.5 cm. or more long, 2-awned per pair; fertile spikelets 7 mm. long, excluding the callus; awn about 7 cm. long 9. *dissoluta*

Raceme-bases subequal or more or less unequal, short and somewhat stout, dorsally flattened, rarely the upper elongated and subfiliform upwards:

Raceme-bases or, at any rate the upper bearded with spreading or suberect stiff tubercle-based hairs:

Raceme-bases not produced at the insertion of the lowest fertile spikelet into a scarious denticulate appendage or only slightly auricled:

Mature peduncles much shorter than the cymbiform spatheoles, glabrous except at the tips, at length little recurved; racemes very numerous, crowded in a large panicle 10. *cymbaria*

Mature peduncles equalling or exceeding the narrow spatheoles, long-pilose with tubercle-based hairs in the upper half, at length markedly recurved; racemes few, in a lax panicle 11. *cyaneascens*



FIG. 377.—*HYPARRHENIA RUFA* Stapf (GRAMINEAE-ANDROPOGONEAE).
 A, ligule. B and C, pair of spikelets. B₁, joint of raceme. B₂, C₁, stalk of stalked spikelet.
 B₃, C₂, stalkless spikelet from back and front respectively. B₄, C₃, stalked spikelet.

- Raceme-bases produced at the insertion of the lowest fertile spikelet into a scarious usually denticulate appendage; peduncles plumose in the upper part :
 Nodes with stiff yellow beards; spatheoles up to 4 cm. long .. 12. *Welwitschii*
 Nodes not bearded, glabrous; spatheoles 4-5 cm. long .. 13. *gracilescens*
 Raceme-bases not bearded, although usually finely pubescent or villous, at least in the fork :
 Racemes spreading, at length epinastically deflexed; glumes rather firm; perennials :
 Racemes 1.6-1.8 cm. long; awns more or less subplumose, 5-6 mm. long; panicles loose, with distant tiers; spatheoles about 5 cm. long .. 14. *subplumosa*
 Racemes 1-1.6 cm. long; awns hirtellous; panicles with up to over 10 tiers, distant below, approximate upwards; spatheoles at most 3 cm. long .. 15. *diplandra*
 Racemes neither spreading nor epinastically deflexed, the inner faces of their bases permanently contiguous or parallel; annuals; spatheoles very long-beaked-acuminate :
 Racemes 1-8 cm. long; fertile spikelets glabrous; panicle very lax, of mixed 3-6-rayed tiers .. 16. *involutrata*
 Racemes 2-4 cm. long; fertile spikelets whitish-tomentose; panicle as above .. 17. *notolasia*
 Lower glume of fertile spikelets with a pair of deep circular or subcircular pits; small annuals a few cm. high; racemes subcontiguous, exerted at a right angle to the spatheole, at length reflexed, about 2 cm. long, 4-7-awned per pair; leaf-blades lanceolate from a rounded base, acutely acuminate, up to 3 cm. long, pilose .. 18. *pusilla*
1. *Hyparrhenia rufa* Stapf—F.T.A. 9: 304; Holl. 814. Perennial up to 8 ft. high or more.
 French Guinea: Baffing Valley (Nov.)! Sierra Leone: Benekoro, 1,000-1,500 ft. Gold Coast: Abure plains, dominant (Apr.)! N. and S. Nigeria: various localities! Widely spread in tropical Africa, Mascarenes and Brazil. Exsicc.—Pobéguin 1816. *Rogee* 228. *Glanville* 318. A. S. Thomas 20. *Holland* 276. *Dalz.* 487.
 2. *H. poecilotricha* Stapf—F.T.A. 9: 309. Perennial 1½ ft. high.
 N. Nigeria: Vodni, Pankshin district! Also in Belgian Congo, Angola, N. Rhodesia and Tanganyika Territory. Exsicc.—*Saunders* 7.
 3. *H. chrysargyrea* Stapf—F.T.A. 9: 312. Annual up to 5 ft. high or more.
 N. Nigeria: Lokoja! Also in the Ubangi district. Exsicc.—*Dalz.* 293.
 4. *H. Smithiana* Stapf—F.T.A. 9: 314. Perennial about 2 ft. high, with rather few pairs of very hairy racemes.
 Cameroons Mt.: 4,000-8,500 ft. (Dec.-Feb.)! Exsicc.—*Mann* 1342; 2079. *Maitland* 934; 1042. *Migeod* 343. *Steele* 51.
 5. *H. hirta* Stapf—F.T.A. 9: 315.
 French Sudan: Central Sahara: Tamanrasset, 5,000 ft. (Feb.)! Taharanet, 5,900 ft. (Mar.)! Also in Cape Verde Islands, N.E. and East Africa and Damaraland. Exsicc.—*Meinertzhagen* 196; 211.
 6. *H. soluta* var. *violascens* Stapf—F.T.A. 9: 318; Holl. 815.
 N. Nigeria: Katagum district! Abinsi (Nov.-Dec.)! Bauchi Plateau! The type in the Shari and Ubangui districts. Exsicc.—*Dalz.* 263; 890; 891. *Lely* 790.
 7. *H. Barteri* Stapf—F.T.A. 9: 321.
 N. Nigeria: confluence of Niger and Benue Rivers! Lokoja! S. Nigeria: Awka district; Agolo, Obo! Also in Ubangui. Exsicc.—*Barter*. *Dalz.* 295. *Thomas*.
 8. *H. filipendula* Stapf—F.T.A. 9: 323.
 N. Nigeria: Bauchi Plateau! Tropical Africa generally. Exsicc.—*Leby* 795; P. 433; P. 807
 9. *H. dissoluta* C. E. Hubbard in Kew Bull. 1936: ined. *H. Ruprechtii* Fourn.—F.T.A. 9: 326; Holl. 814. *Anthistiria dissoluta* Nees ex Steud.
 Ivory Coast: Adioukrou country; Dabon! Dahomey: Zumbodje! S. Nigeria: Lagos! Awowo! Quorra! N. Nigeria: Jebba! Lokoja, prevalent! Katagum district! Tropical Africa generally, S. Africa, Madagascar and tropical America. Exsicc.—*Chev.* 17150. *Newton*. *Macgregor* 320. *Dawodu* 52. *Vogel* 102. *Barter* 102; 281. *Richardson*. *Dalz.* 265.
 10. *H. cymbaria* Stapf—F.T.A. 9: 332. Perennial up to 20 ft. with numerous spatheolate racemes in rather dense panicles.
 S. Nigeria: Bamenda, 5,000 ft. (Jan.)! Also in Angola and E. Africa, and in Comoro Islands and Mascarenes. Exsicc.—*Unwin* 221. *Migeod* 315.
 11. *H. cyanescens* Stapf—F.T.A. 9: 351. Perennial up to 6 ft. or more.
 French Guinea: Kouroussa (Sept.)! Middle Niger (Oct.)! N. Nigeria: Upper Benue Basin! Exsicc.—*Pobéguin* 508; 514. *Chev.* 2359. *Macleod* 93.
 12. *H. Welwitschii* Stapf—F.T.A. 9: 357. Up to 9 ft. high.
 French Guinea: Timbo (Oct.)! Also in Cameroons and Angola. Exsicc.—*Pobéguin* 1796; 1797.
 13. *H. gracilescens* Stapf—F.T.A. 9: 357. Annual up to 4 ft. high, with stiff roots from lower nodes.
 French Guinea: Futa Jallon; between Dalaba and Sougouta! Sierra Leone: Mamodia! N. Nigeria: Lokoja (Oct.)! Exsicc.—*Chev.* 20196. *Dalz.* 292. *Glanville* 330.
 14. *H. subplumosa* Stapf—F.T.A. 9: 366; Holl. 815. Perennial up to 10 ft. or more.
 French Guinea to N. and S. Nigeria! Exsicc.—*Pobéguin* 1799; 1812. *Chev.* 20185. *Sc. Elliot* 5931. *Deighton* 877. *Baummann* 325. *Hagerup* 721a. *Dalz.* 298; 889; 901. *Williams* 852. *Saunders* 3.
 15. *H. diplandra* Stapf—F.T.A. 9: 368. Perennial up to 12 ft. or more.
 French Guinea: Baffing Valley (Oct.)! Sierra Leone: Mamodia! Ivory Coast: between Bingerville and Lagune Potou! N. Nigeria: Naraquta! S. Nigeria: Ogoja Prov.! Bamenda, 5,000-6,000 ft. (May)! Tropical Africa generally. Exsicc.—*Pobéguin* 1803. *Chev.* 20091. *Glanville* 329. *Lely* P. 445. *Rosevear* 16/30A. *Maitland* 1-3A.
 16. *H. involutrata* Stapf—F.T.A. 9: 376.
 N. Nigeria: Nupe (?)! Exsicc.—*Barter* 957.
 17. *H. notolasia* Stapf—F.T.A. 9: 377. Annual 8-10 ft. high.
 N. Nigeria: Lokoja (Oct.)! Also in Ubangui. Exsicc.—*Dalz.* 299.
 18. *H. pusilla* Stapf—F.T.A. 9: 379. Recognised at once by its small stature and the large pits on the back of the lower glume.
 Cameroons Mt.: 7,000 ft. (Dec.)! Exsicc.—*Mann* 2097.

113. MONOCYMBIUM Stapf—F.T.A. 9: 386.

Culms erect, rather slender, nodes glabrous; perennials, densely tufted; leaf-sheaths terete, tight, usually glabrous and closely ribbed; ligule short, truncate, glabrous;

leaf-blades linear from an equally broad base, very acute, up to 15 cm. long and 6 mm. broad, usually long-pilose on both surfaces, finely scabrid on the margin; panicle raceme-like, narrow; branches with very slender peduncles bearing usually a single short subsecund raceme shorter than and embraced by a boat-shaped lanceolate acuminate purplish spatheole about 3-4 cm. long; sessile spikelets awned, awns long and conspicuous, spirally twisted in the lower half; upper glume of sessile spikelet long-aristate; glumes of the pedicelled spikelet rigid, shortly pilose

Culms procumbent at the base, rooting from the lower nodes, many-noded; leaf-sheaths glabrous; leaf-blades broadly lanceolate from a rounded-auriculate base, 4.5-9 cm. long, 1-2 cm. broad, glaucous below, glabrous except the margins towards the base; lateral nerves about 7 on each side; panicle very lax, up to 45 cm. long; spatheoles narrowly boat-shaped, 2-3 cm. long 2. *lanceolatum*

1. *M. ceresiiforme* Stapf—F.T.A. 9, 3: 387; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 877; Holl. 815. Tufted, up to 4 ft. high; spathes purplish, becoming russet-brown.
French Guinea: Kouroussa (Sept.)! Gold Coast! Togo: Agome Mts.! N. Nigeria: Abini! Lokoja (Oct.)! Confluence of Niger and Benue! Jeba! Extends through the Ubangui to Southern Sudan and Somaliland, and through the Congo to Angola, Nyasaland and the Northern Transvaal to Pondoland. Exsicc.—Pobéguin 511. Beal 42. Baumann 346. Dalz. 284; 893. Barter. (See Appendix).
2. *M. lanceolatum* C. E. Hubbard in Kew Bull. 1936: ined. Very like the above but decumbent and with broader-based leaves.
Sierra Leone: between Mamuria and Kulufaga! Fontane, open places in bush country (Nov.)! Exsicc.—Glanville 100; 387.

114. ANADELPHIA Hack.—F.T.A. 9: 388.

Upper glume of sessile spikelet aristulate; awn of fertile floret up to 4 cm. long; Racemes reduced to a single pair of spikelets; panicle decompound, lax and flaccid; upper simple rays 6-12 mm. long; peduncle at maturity shorter than the spatheole; spikelets small, 4-6 mm. long; awn of fertile floret 2 cm. long .. 1. *trepidaria*
Racemes of 1-5 sessile and as many (or one more) pedicelled spikelets or empty pedicels: if only 1 sessile spikelet then the peduncle more or less exerted from the spatheole: Sessile spikelets 4-5 mm. pedicelled 4-6 mm. long; awn of fertile floret 8-14 mm. long;
Sessile spikelets glabrous and glossy except on the callus and acumen; simple rays 12-24 mm. long; spatheoles 14-20 mm. long;
Peduncles at maturity more or less exerted terminally from the spatheole; racemes with 1-4 sessile spikelets;
Panicles loose; peduncles 1.8-3 cm. long;
Panicle decompound, lax and flaccid; rays and peduncles capillary or almost so, the latter 2-3 cm. long; awn 8-12 mm. long, pale brown; blades of upper leaves 4-5 mm. broad, rounded at the base 2. *leptocoma*
Panicle less compound, stiff and contracted; rays and peduncles finely filiform, the latter 1.8-2.4 cm. long; awn 1.5 cm. long, column dark brown; blades of upper leaves not quite 2 mm. broad, passing gradually into the base, narrower than the sheath 3. *tenuifolia*
Panicles very dense and contracted; peduncles 1.5-2 cm. long; leaves broader than the sheath 4. *triseta*
Peduncles very short (6 mm. long in flower); panicle narrow and stiff, all the tiers distant and scanty; racemes with 3-5 sessile spikelets; awn very delicate, 1 cm. long; upper leaf-blades very long and narrow 5. *longifolia*
Sessile spikelets pubescent; simple rays 5-10 cm. long, the outermost of some tiers frequently barren, with crowded short normal leaves 6. *pubiglumis*
Sessile spikelets 4.5-8 mm., pedicelled 7-12 mm. long; awn of fertile floret 1.6-4 cm. long; racemes with 2 sessile and 3 pedicelled spikelets;
Sparingly hairy to glabrous; awned lemma shortly 2-lobed or 2-toothed 7. *arrecta*
Very hairy all over; awned lemma 2-fid to the middle 8. *Afzeliana*
Upper glume of sessile spikelet without a bristle, 3-dentate; awn 7 cm. long; racemes with 7 sessile and 2 pedicelled spikelets 9. *trispiculata*

1. *Anadelphia trepidaria* Stapf—F.T.A. 9: 390.
French Guinea: Kouroussa (Oct.-Nov.)! Exsicc.—Pobéguin 524; 531.
2. *A. leptocoma* Stapf—F.T.A. 9: 391.
Sierra Leone: Newton (Nov.)! Njala (Sept.)! Kitchom (Jan.)! Magbao (Oct.)! Liberia: Monrovia! Exsicc.—Blyth. Naumann 28. Dinklage 1770; 2512. Deighton 1455; 2116. Glanville 336. (See Appendix).
3. *A. tenuifolia* Stapf—F.T.A. 9: 392.
French Guinea: Futa Jallon; damp places near Timbo (Oct.)! Exsicc.—Pobéguin 1788; 1789.
4. *A. triseta* Reznik in Rev. Bot. Appl. Agric. Trop. 1934: 198. Perennial up to 3 ft. high.
French Guinea: Kindia, Frigulagbé! Exsicc.—Jacques-Felix 253.
5. *A. longifolia* Stapf—F.T.A. 9: 393.
French Guinea: Baffing Valley (Oct.)! Sierra Leone: Blama (Oct.)! Exsicc.—Pobéguin 1789 bis. Deighton 50.
6. *A. pubiglumis* Stapf—F.T.A. 9: 394.
S. Nigeria: Lagos, Bere! Exsicc.—Dawodu 57. (See Appendix).
7. *A. arrecta* Stapf—F.T.A. 9: 396.
French Guinea and Sierra Leone: numerous localities! Gold Coast: Kikum! Dahomey! S. Nigeria: Lagos! Ogoja Prov.! Also in Belgian Congo. Exsicc.—Chev. 18665. Pobéguin 519; 520; 1794; 1795.

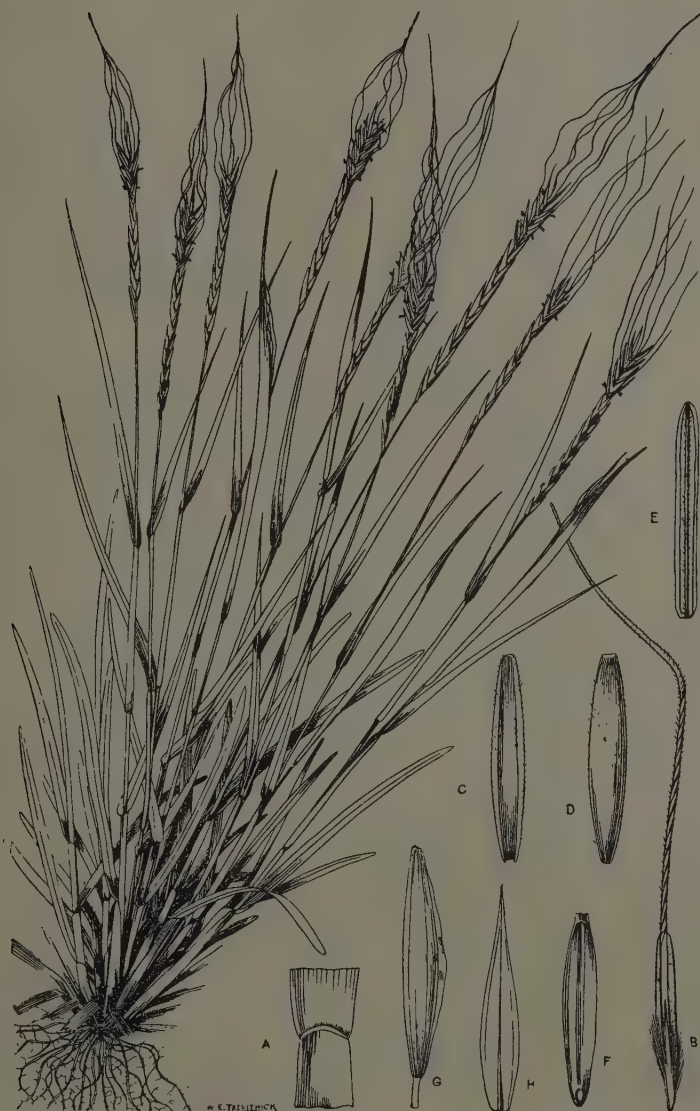


FIG. 378.—*HETEROPOGON CONTORTUS* Beauv. ex Roem. & Schult. (GRAMINEAE-ANDROPOGONEAE).

A, ligule. B, stalkless fertile spikelet showing glumes, bristle and pointed base. C, D, lower glume, front and back view. E, upper glume. F, grain. G, stalked sterile spikelet showing lower glume. H, upper glume.

Thomas 2487. Glanville 319. Deighton 79; 260; 2117; 2300. Chipp 311. Dawodu 320. Dalz. 1317. Maitland 160. (See Appendix).

A. *Chevalieri* Reznik in Rev. Bot. Appl. Agric. Trop. 1934: 199, may be the same species. I have not seen a specimen.

8. *A. Afzeliana* Stapf—F.T.A. 9: 397.

Sierra Leone: Regent! Waterloo (Oct.)! Benekoro! Kambia (Dec.)! Exsicc.—Sc. Elliot 4108.

9. *A. trispiculata* Stapf—F.T.A. 9: 398.

French Guinea: Baffing Valley (Oct.)! Exsicc.—Pobéguin 1787.

115. *MONIUM* Stapf—F.T.A. 9: 399.

A delicate annual about 0.3 m. high; culms erect, simple, glabrous; leaf-sheaths tight, glabrous; ligule very short, ciliolate; leaf-blades finely linear, 3–5 cm. long, minutely scabrid on the margins, finely pointed; panicle narrow; spatheoles very narrow and tightly inrolled, long-acuminate, 2.2–5 cm. long, pinkish, glabrous; spikelets all alike, solitary, hermaphrodite, awned, enclosed in the spathe; glumes equal, rounded on the back, the lower 2-toothed at the apex, the upper produced into a fine bristle from the notched tip, about 8-nerved; awns long, spirally twisted below the “knee” *macrochaetum*

M. *macrochaetum* Stapf—F.T.A. 3: 400; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 877. M. *trichaetum* Reznik?

French Guinea: Timbo, on moist or inundated land (Oct.)! Exsicc.—Pobéguin 1790.

116. *TRACHYPOGON* Nees—F.T.A. 9: 400.

Leaf-blades linear, long-tapered and very acute, about 12 cm. long and 3 mm. broad, thinly pilose; ligule firm and rather long; racemes solitary, at length exserted from the uppermost sheath, about 7 cm. long, with 9–12 pairs of spikelets, the lowest imperfect and barren; fertile spikelets 8 mm. long including the acute densely and long-fulvo-setose callus; lower glume 10-nerved and setulose, upper ciliate; lower floret reduced to a delicate 2-nerved ciliolate lemma; lemma of upper floret passing into a large twisted awn up to 8.5 cm. long, white-setulose below the middle

Ledermannii

T. *Ledermannii* Pilger—F.T.A. 9, 1: 402. Probably an annual, about 2 ft. high; nodes densely bearded with a ring of stiff hairs; inflorescence with very long hairy awns.

N. Nigeria: Naraguta, Bauchi Plateau (Aug.)! Also in French Cameroons. Exsicc.—Tely P. 449.

117. *ELYMANDRA* Stapf—F.T.A. 9: 407.

A coarse annual up to 2 m. high; culms glabrous; leaf-sheaths tight, shorter than the internodes; ligules membranous, truncate, short; leaf-blades linear, tapered to a fine point, pinkish-glaucous, spinulose on the margins; upper leaves often villous at the top of the sheath; panicle very lax; spatheoles narrow, with a long setaceous point, 7–10 cm. long, at length tightly inrolled; peduncles slender, exserted from the spatheole, pubescent; racemes paired, loose, about 2.5 cm. long; uppermost pair of spikelets different in sex and shape, lower pairs alike in shape, one sessile, the other pedicelled *androphila*

E. *androphila* Stapf—F.T.A. 9: 408; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 878.

French Guinea: Kouroussa (Sept.)! Timbo (Oct.)! Futa Jallon! Exsicc.—Chev. 18631. Pobéguin 521; 1798.

118. *HETEROPOGON* Pers.—F.T.A. 9: 410.

Perennial, up to 1 m. high; culms erect or ascending; leaves glaucous-pruinose; sheath compressed, keeled; ligules short, truncate, ciliolate; blades linear from a wide base, shortly acute to subobtusate, up to 25 cm. long and 7 mm. broad, folded in bud; primary lateral nerves 3–4 on each side; racemes simple, up to about 8 cm. long, the uppermost flowers with very long hairy awns; spatheole 8–10 cm. long, tightly inrolled; at length exserted from the spatheole, slender; spikelets 2-nate, the lower pairs male or neuter, the upper pairs differing in sex and shape; pedicelled spikelets oblong-lanceolate, subacute, 8–10 mm. long, their lower glume without a longitudinal median series of depressed glands; glumes of fertile spikelet equal, lower about 9-nerved 1. *contortus*

Annual; leaf-sheaths terete or only slightly compressed; blades long-tapered to a fine point; pedicelled spikelets lanceolate, long-subulate-acuminate, 1.6–2 cm. long, with a longitudinal series of depressed glands 2. *melanocarpus*

1. *H. contortus* Roem. & Schult.—F.T.A. 9: 411; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 878; Holl. 816. Common throughout tropical Africa and adjacent islands, and in tropical and subtropical regions generally. (See Appendix).

2. *H. melanocarpus* Benth.—F.T.A. 9: 413; A. Chev. Rev. Bot. Appl. Agric. Trop. 1933: 34. Up to 6 ft. high; culms often with stilt-roots from the lowest nodes.

Dahomey: between Bagula and Tchitopa. Also in Abyssinia and South Tropical Africa, and widely spread in the tropics of the world; probably of American origin. Exsicc.—Chev. 23209 (not seen).

119. *THEMEDA* Forssk.—F.T.A. 9: 415.

Perennial up to 1.3 m. high, densely caespitose; culms glabrous, erect or ascending, often bearing short barren branches; leaf-sheaths keeled, shorter than the internodes;



FIG. 379.—*THEMEDA TRIANDRA* Forssk. (GRAMINEAE-ANDROPOGONEAE).

A, ligule. B, cluster of spikelets projecting from spathe (partly cut off). B₁, stalkless sterile spikelets. B₂, stalkless perfect spikelet with bristle. B₃, stalked sterile spikelet. C, enlargement of B₂ (C₁) and B₃ (C₂).

ligules scarious, truncate, ciliate; blades linear from a broad base, up to 20 cm. long, tapered to a slender point, usually glaucous, glabrous or pubescent; panicle narrow, erect, branches very slender; spatheoles compressed, boat-shaped, up to 5 cm. long, with scarious margins and tips; racemes normally with a single fertile spikelet awned; involucrel spikelets with the lower glumes often clothed in the upper part with a few tubercle-based bristles *triandra*

T. triandra Forsk.—F.T.A. 9: 416; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 878. Holl. 817. *T. Forskalii* vars. *glauca* and *vulgaris* Chev. Bot. 721.

French Sudan: San (Sept.)! French Guinea: Futa Jallon, between Timbo and Detinn (Sept.)! A variable species ranging over most of Africa, and one of the commonest grasses of the drier regions, often forming extensive associations; the "Rooi-grass" of South Africa. Exsicc.—Chev. 2362; 18503. (See Appendix).

120. ARTHRAXON Beauv.—F.T.A. 9: 162.

Racemes conspicuously hairy, about 2 cm. long, on very slender peduncles; culms very slender, ascending from a decumbent base; leaf-sheaths loose; ligules membranous, short, ciliate; leaf-blades oblong-lanceolate setose-acuminate, cordate and amplexicaul at the base, about 2 cm. long, shortly and softly pubescent on both sides, long-ciliate around the base; spikelets solitary or the upper paired

1. *lanceifolius*

Racemes glabrous or nearly so; habit, etc., more or less as above, but leaves laxly long-pilose without shorter hairs, the spikelets always solitary and the pedicels reduced to a minute point or subule 2. *Quartinianus*

1. **A. lanceifolius** Hochst.—F.T.A. 9, 1: 165; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 860. *A. microphyllus* Hochst.—Chev. Bot. 715. A slender grass with cordate leaves.

French Sudan: Koulikoro (Oct.)! French Guinea: Futa Jallon Plateau! Also in Cape Verde Islands, and extending eastwards to S.W. China. Exsicc.—Chev. 2237; 2238; 18877.

2. **A. Quartinianus** Nash.—F.T.A. 9, 1: 166; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 861. Stoutier than the preceding, up to 1 ft., with decumbent stems.

French Guinea: Timbo! Cameroons Mt.: Buea, 3,000 ft. (Dec.)! Tropical Africa generally to India. Exsicc.—Poeblein 1709. Maitland 103; 353.

121. ISCHAEMUM Linn.—F.T.A. 9: 28.

Lower glume of sessile spikelet strongly transversely ribbed, with a green herbaceous ovate tip, about 5 mm. long, yellowish-green; leaf-blades linear-lanceolate, up to 15 cm. long, sparingly shortly pilose on both surfaces; sheaths pilose towards the margin near the top; awns 2 cm. long, slender, spirally twisted in the lower half

1. *rugosum*

Lower glume of sessile spikelet not transversely rugose:

Leaf-blades comparatively short and lanceolate:

Sessile spikelets flat or convex on the back:

Racemes 3, about 2 cm. long 2. *tallanum*

Racemes 2, 3–6 cm. long 3. *timorense*

Sessile spikelets concave on the back; racemes about 12 cm. long, often tinged with purple; spikelets 6–8 mm. long 4. *brachyatherum*

Leaf-blades elongated and linear, glabrous, about 20 cm. long; ligule shortly ciliate; nodes contracted, thinly pilose; racemes flattened on one side, about 8 cm. long; lower glume oblong-ovate, with wing-like margins and longitudinally ribbed in the upper part; pedicels densely ciliate, 3 mm. long 5. *aristatum*

1. **Ischaemum rugosum** Salisb. Ic. Stirp. Rar. 1, t. 1. Culms 3 ft. high, branched, purplish; pairs of racemes firmly adpressed together, at length separating, with one flat side each.

Sierra Leone: Kambia, common in fresh water rice-swamps (Dec.)! Freetown, edge of ditch (Oct.)! Widely spread in the eastern tropics. Exsicc.—Deighton 805; 2193.

2. **I. tallanum** Rendle—F.T.A. 9: 31.

Sierra Leone: Nina; Talia (Feb.)! Exsicc.—Se. Elliot 4927.

3. **I. timorense** Kunth—Rev. Gram. 1: 369, t. 98. A rambling grass, forming pure patches; nodes bearded. Cameroons Mt.: Buea, 3,000 ft. 1 and at Victoria! Probably introduced, native of Malay Archipelago. Exsicc.—Maitland 91; 154; 857.

4. **I. brachyatherum** Fenzl ex Hack.—F.T.A. 9: 30.

N. Nigeria: Kwerre, 16 miles north of Sokoto, common (Sept.)! Extends to East Africa. Exsicc.—Palmer 17.

5. **I. aristatum** Linn.—Sp. Pl. 1049.

S. Nigeria: Opobo, by roadsides (Oct.)! Widely spread in the eastern tropics. Exsicc.—Maitland 64.

122. SCHIMA Forssk.—F.T.A. 9, 1: 35.

Annual; culms in small fascicles, simple, 2–3-noded; nodes glabrous; ligule a fringe of stiff hairs; blades linear, tapering to a long fine point, up to 12 cm. long and 2–4 mm. broad, scabridulous, with 1–2 primary lateral nerves; racemes solitary, up to 8 cm. long; joints and pedicels parallel, 4 mm. long, very densely ciliate from white hairs along the angles; sessile spikelets linear, about 1–1.4 cm. long, pale green, with a shortly bearded callus; lower glume with unequally 2-toothed flat and membranous long beak, acutely 2-keeled, intracardinal nerves 3–5, raised, rough; awn distinctly ciliate along the spiral; pedicelled spikelets long-acuminate, up to 1.6 cm. long, the lower glume with 2 long setaceous teeth *ischaemoides*



FIG. 380.—THELEPOGON ELEGANS Roth ex Roem. & Schult. (GRAMINEAE-ANDROPOGONEAE).

A and B, spikelets.

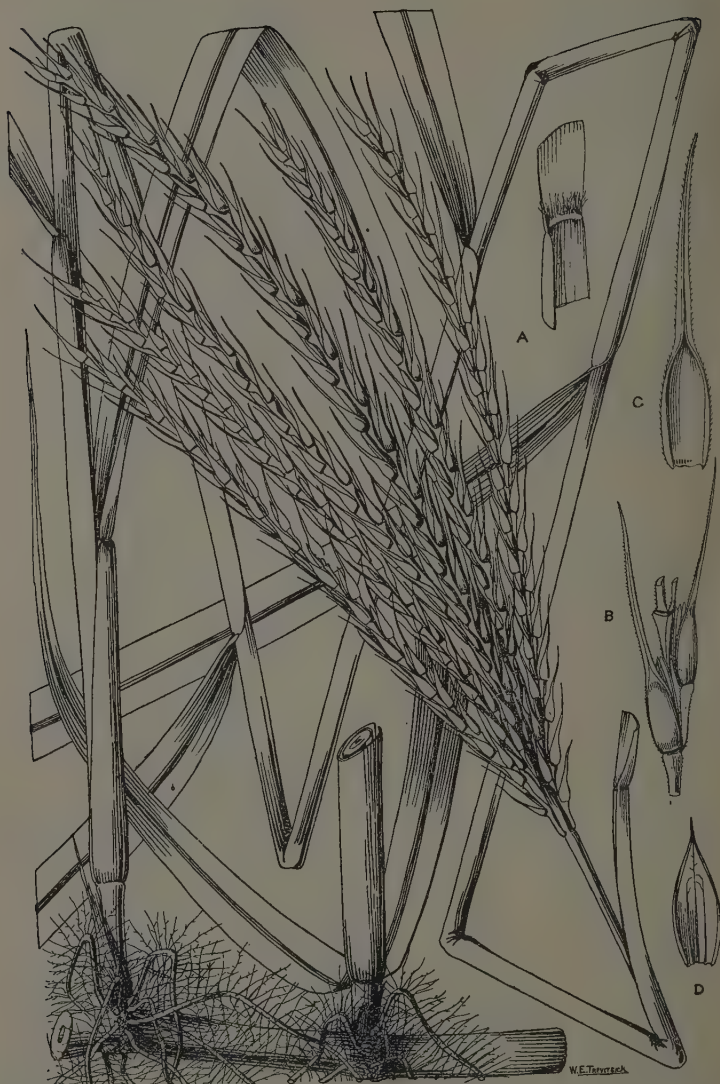


FIG. 381.—*VOSSIA CUSPIDATA* Griff. (GRAMINEAE-ANDROPOGONEAE).
 A, ligule. B, stalked and stalkless spikelets. C, lower glume, and D, upper glume of
 stalkless spikelet,

S. ischaemoides Forssk.—F.T.A. 9, 1: 37; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 849. Culms rarely over 2 ft. high, with erect or slightly nodding racemes with long-coiled awns.
Central Sahara: south of Adrar des Iforas, between Tabankort and Gao. Also in Cape Verde and French Cameroons, and from N.E. Tropical Africa to the Deccan Peninsula, India. Exsicc.—*Lectercq* 42658 (not seen). (See Appendix).

123. THELEPOGON Roth—F.T.A. 9: 34.

Annual; culms rooting towards the base; leaf-sheaths closely ribbed, more or less pilose with tubercle-based hairs, ciliate; ligules ciliate; leaf-blades lanceolate, acute, broad and subordinate at the base, the upper ones about 15 cm. long and 3 cm. broad, margins rigidly pectinate; lateral nerves several, prominent; racemes several in a bunch, up to 17 cm. long, stiff; peduncles hispidulous; joints nervose; empty pedicel linear, longer than the spikelet, the latter about 7 mm. long; glumes subequal, the lower very prominently transversely rugose-tuberculate; awn up to 2.5 cm. long, bent in the middle *elegans*

T. elegans Roth ex Roem. & Schult.—F.T.A. 9: 34; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 849; Holl. 775. French Sudan: Niamey (Oct.)! N. Nigeria: Katagum! Sokoto! Bauchi Plateau! S. Nigeria: Lagos! Through Abyssinia to Portuguese East Africa; also in India and Siam. Exsicc.—*Hagerup* 538. *Barter* 730. *Dalz.* 284. *Moiser* 132a. *Lely* 775. *Macgregor* 99. (See Appendix).

124. VOSSIA Wall. & Griff.—F.T.A. 9: 41.

Perennial; culms submerged or floating, rooting from the submerged nodes; leaf-sheaths smooth; nodes glabrous; ligules short, ciliate; leaf-blades linear, tapering to a fine point, up to 1 m. long, 2-3 cm. broad, scabrid on the nerves and margin; racemes several in a bunch, rarely solitary, up to 25 cm. long; joints setulose on the back; lower glume with a tail up to 3 cm. long and setulose on the margin, nearly smooth on the back *cuspidata*

V. cuspidata Griff.—F.T.A. 9: 41; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 849; Holl. 775. French Sudan: south of Auzongo (Sept.)! Sierra Leone: swamps east of Bap to Pujehun (Dec.)! Bun—Kittam river area (Sept.)! N. Nigeria: Sokoto (Nov.)! Katagum! Swamp regions of tropical Africa generally and in India. Exsicc.—*Hagerup* 431. *Sampson* 54. *Fisher* in *Herb. Deighton* 1770. *Dalz.* 291; 508. (See Appendix).

125. URELYTRUM Hack.—F.T.A. 9: 42.

Racemes solitary; annual; leaf-sheaths glabrous, tight; ligules membranous, 3-4 mm. long, the middle part splitting up; leaf-blades narrowly linear, tapering to a long setaceous point, up to 30 cm. long and 3 mm. broad, finely scabrid; racemes up to 15 cm. long, pubescent or glabrous; glumes of sessile spikelet subequal, lower cartilaginous and minutely muricate along the keels; lower glume of pedicelled spikelet produced into a shortly ciliate awn about 3 cm. long . . . 1. *annuum*

Racemes numerous, in whorls; perennial; leaf-sheaths firm; ligules ciliate with long hairs; leaf-blades linear, long-tapered, up to 1 m. long and 2.5 cm. broad, scabrid above and on the margins; racemes slender, up to 15 cm. long; lower glume of sessile spikelet obscurely muricate on the keels; lower glume of pedicelled spikelet with or without a pubescent bristle-like awn about 1.5 cm. long . . . 2. *thyrsioides*

1. **U. annum** Stapf—F.T.A. 9: 44; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 850. French Guinea: Timbo (Oct.)! Futa-Jallon: between Soumbalako and Boulivel! Koulkoro! Exsicc.—*Chev.* 2387; 18667. *Pobéguin* 1773.
2. **U. thyrsioides** Stapf—F.T.A. 9: 47. A tall stout grass of marshes and river banks. N. Nigeria: Abinsi; Katsina River (Aug.)! Extends to the Belgian Congo. Exsicc.—*Dalz.* 902. (See Appendix).

126. JARDINEA Steud.—F.T.A. 9: 50.

Perennial; leaf-sheaths closely ribbed, glabrous; ligules minutely ciliate; nodes pubescent; leaf-blades broadly linear, tapered to a fine point, up to 0.5 m. long and 0.5-1 cm. broad, smooth; nerves numerous and very close; racemes numerous on a common rachis, the lower verticillate, slender, up to 25 cm. long; joints of the racemes scabrid on the margins; lower glume of sessile spikelet produced into a scabrid acumen, spinulose-muricate on the margins *congoensis*

J. congoensis Franch.—F.T.A. 9: 53; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 850; Holl. 775. A tall grass of swampy places, river banks, etc. Togo: near Lomé! N. Nigeria: Nupe! Abinsi! Naraguta! S. Nigeria: Lagos! Ogun River! Extends to Southern Sudan, Belgian Congo and Angola. Exsicc.—*Warnecke* 235. *Barter* 1381. *Dalz.* 898; 1421. *Lely* 442. *Macgregor* 86. *Millen* 131. (See Appendix).

127. LASIURUS Boiss.—F.T.A. 9: 60.

Perennial, almost subwoody at the base; leaf-sheaths terete, tight, the lower long-persistent; ligule a fringe of hairs; blades linear, long-attenuated to a fine setaceous point, the lower up to 30 cm. long, glaucous, glabrous except for a few tubercle-based hairs towards the ligule; racemes up to 10 cm. long, densely villous; sessile spikelets lanceolate 7-9 mm. long, from a narrow annular callus, bearing dense erect hairs up to 6 mm. long, pale green; lower glume flat, glabrous, but densely long-ciliate almost

from the base; upper glume boat-shaped, 5-nerved, ciliate; lemma oblong, 4 mm. long, hyaline, glabrous *hirsutus*

L. hirsutus Boiss.—F.T.A. 9, 1: 60; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 851. Up to 3 ft. high; racemes fragile, silky villous.

Mauritania: Tasiast. Central Sahara: Adrar des Iforas, Afr. Also in N.E. Africa, through Egypt to N.W. India. Exsicc.—Chev. 42906; 43428; 43595 (not seen). (See Appendix).

128. ELIONURUS Humb. & Bonpl.—F.T.A. 9: 62.

Lower glume of sessile spikelet pectinate on the margin, the teeth-like processes bearing dense tufts of white hairs:

Perennial; culms mostly simple, with densely bearded nodes; leaves pilose or glabrescent; ligule densely ciliate; racemes 4–7 cm. long; lower glume of sessile spikelet thinly villous on the back, broadly lanceolate, about 6 mm. long, ending in 2 bristles 1. *hirtifolius*

Annual; otherwise as in preceding, but habit more delicate, leaves glabrous or nearly so; nodes of the culms less densely bearded; lower glume appressed-pubescent on the back 2. *elegans*

Lower glume of sessile spikelet simply ciliate:

Racemes not villous all over, only with long hairs on the joints or shortly hairy:

Racemes with very long hairs at the joints, these hairs much longer than the cilia on the margins of the lower glume of the sessile spikelet, the latter glabrous on the back; racemes slender, usually about 7 cm. long; leaves spinulose-ciliate towards the apex; nodes of the culms glabrous 3. *platypus*

Racemes with short hairs at the joints, the hairs about as long as the cilia on the margins of the lower glume of the sessile spikelet

Sessile spikelets 7–8 mm. long; culms much branched upwards 4. *Pobeguini*

Sessile spikelets 6 mm. long; culms less branched upwards 5. *tenax*

Racemes densely long-villous all over, 7–10 cm. long; nodes of the culms glabrous; leaf-blades long-ciliate at the base, otherwise glabrous. 6. *Chevalieri*

1. *Elionurus hirtifolius* Hack.—F.T.A. 9: 63; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 851. One of the earliest grasses in the savannah after fires; perennial with simple or slightly branched culms. French Sudan: Mossi (Aug.)! N. Nigeria: Nupe, dry stony hills! Around Lokoja (June, Sept.)! Abinsi (Mar.)! Bauchi Plateau (Jan.)! Also in the Shari and French Cameroons. Exsicc.—Barter 1176. Parsons 35. Dalz. 878. Lely P. 157. Chev. 24798.

2. *E. elegans* Kunth—Rev. Gram. 161, 361, t. 94; F.T.A. 9: 64; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 851. In dry places, apparently rare.

Senegal: Walo country! French Guinea: Koulikoro! N. Nigeria: Nupe! Niamey (Oct.)! Exsicc.—Roger. Heudelot 384. Chev. 2201, partly. Hagerup 494. Barter 993. (See Appendix).

3. *E. platypus* Hack.—F.T.A. 9: 66; Chev. Bot. 715, and Rev. Bot. Appl. Agric. Trop. 1933: 852. A tufted grass up to 6 ft. high.

French Guinea: Futa Jallon; Diaguissa, 4,000–4,200 ft. (Apr.)! Sierra Leone: Matotoka (July)! Juring (Dec.)! Kitchom (Jan.)! Tower Hill, Freetown (Aug.)! Karina (Feb.)! Exsicc.—Chev. 12659. Barter. Thomas 1249. Deighton 456; 1007; 2053. Glanville 156.

4. *E. Pobeguini* Stapf—F.T.A. 9: 67. Tall grass, much-branched upwards.

French Guinea: Kouroussa! Timbo! Exsicc.—Pobeguini 517; 1772.

5. *E. tenax* Stapf—F.T.A. 9: 68.

French Guinea: Kankan! Exsicc.—Bardon 15; 36.

6. *E. Chevalieri* Stapf—F.T.A. 9: 70; Chev. Bot. 715. Tufted, 2 ft., one of the earliest to flower after burning.

French Guinea: Sangorla, near Kouroussa (Feb.)! N. Nigeria: Abinsi (Mar.)! Bauchi Plateau (Jan.)! Also in the Shari region. Exsicc.—Chev. 341. Dalz. 866. Lely P. 92.

129. CHASMOPODIUM Stapf—F.T.A. 9: 76.

Culms up to 3 m. high, branched; leaf-sheaths smooth or scabrid; ligule a line of rather long hairs; leaf-blades narrowly linear-lanceolate, narrowed at the base, long setaceous-acuminate, up to 55 cm. long and 2 cm. broad, rough on the margin, with about 4 main nerves on each side of the midrib; racemes 5–13 cm. long, the glumes of the terminal spikelet sometimes foliaceous and produced into a twisted tail about 2.5 cm. long; joints about $\frac{1}{2}$ as long as the sessile spikelet, ciliate along the outer angle; lower glume of latter rigidly coriaceous, ovate to oblong, bifid at the apex *caudatum*

C. *caudatum* Stapf—F.T.A. 9: 77; Stapf in Hook. Ic. Pl. t. 3082. C. *Afzelii* Stapf—F.T.A. 9, 1: 77. A tall tufted grass 5–10 ft. high. Chev. in Rev. Bot. Appl. Agric. Trop. 1933: 854. *Rottboellia Kerstingii* Pilger.

French Guinea: Timbo! Sierra Leone: “very common over the hills” (Sc. Elliot). N. Nigeria: Vodni, Bauchi Plateau! S. Nigeria: Lagos! Extends to the Eastern Sudan, Belgian Congo and Angola. Exsicc.—Pobeguini 1805. Afzelius. Sc. Elliot 3938. Thomas 3346; 3506; 3807; 5116. Davis 686. Saunders. MacGregor 168. Deighton 855. Glanville 59. (See Appendix).

130. COELORHACHIS Brongn.—F.T.A. 9, 1: 78.

Culms 1–2 m. high, glabrous, stout; leaf-sheaths smooth, very closely nerved; ligule very short, truncate, densely and shortly ciliate; leaf-blades linear, gradually narrowed from the base, acute, the basal ones about 30 cm. long, the cauline much shorter, often reddish, scabrid-toothed on the margin; nerves closely parallel; panicle up to 30–35 cm. long, the branches subtended by narrow reduced leaves; racemes 5–7 cm. long, about 2.5 mm. thick; sessile spikelet oblong, 3–4 mm. long;

lower glume winged upwards, wings produced beyond the tip and leaving a narrow sinus; pedicelled spikelet smaller than the sessile; pedicels 3 mm. long, compressed, with a lanceolate wing-like appendage from the outer angle . . . *afraurita*

- C. afraurita** Stapf—F.T.A. 9, 1: 80. *Rotboellia afraurita* A. Chev. Bot. 713, name only. A tall tufted grass 8-9 ft. high in wet places.
French Sudan: Bammako, Soknafni Falls (Jan.)! Sierra Leone: Kennema (Nov.)! Also in East Africa from Uganda to Rhodesia, and in Angola. Exsicc.—Chev. 232. Deighton 455. (See Appendix).

131. RHYTACHNE Desv.—F.T.A. 9: 81.

Perennial with numerous thick roots from a rhizome; flowering culms and leaf-shoots densely tufted, often tinged with pink; racemes solitary, spike-like, very slender, 8-11 cm. long, green or purplish; lower glume of sessile spikelet transversely ridged in the lower half, stiffly setulose-ciliate towards the apex, the latter terminating in 1 or 2 short bristles; leaf-sheaths smooth, auricled at the apex; ligule ciliate; leaf-blades folded, setaceous, the lower up to 30 cm. long, ribbed . . . 1. *rotboelloides*

Annuals, all the culms flowering:

Lower glume of the sessile spikelet with 2 often unequal bristles at the apex; joints of the rachis of the raceme ciliate:

Pedicels with a terminal pair of often very unequal bristles; racemes pale green or yellowish-green, rather rigid, for some time partially enclosed by the uppermost sheath, 10-12 cm. long; lower glume of sessile spikelet strongly transversely ridged in the lower $\frac{2}{3}$, upper $\frac{1}{3}$ triangular, thin and ciliate; ligule ciliate; leaf-blades folded, setaceous to linear . . . 2. *triaristata*

Pedicels with a single bristle at the apex; racemes pinkish, slender, soon exerted from the leaf-sheath, up to 10 cm. long; lower glume of sessile spikelet faintly rugose to strongly transversely ridged in the lower $\frac{2}{3}$, the upper $\frac{1}{3}$ triangular and scabrid-ciliate on the margin; ligule shortly ciliate; leaf-blades filiform, the upper ones very short . . . 3. *gracilis*

Lower glume of the sessile spikelet with only 1 awn; joints of the rachis of the raceme glabrous; racemes slender, flexuous, pinkish, 3-4 cm. long; lower glume slightly rugose in the lower half, terminated by a long slender bristle as long as the glume; leaf-sheaths smooth; ligule auriculate, minutely ciliate; leaf-blades filiform, up to 11 cm. long, smooth, the upper much reduced . . . 4. *minor*

1. *R. rotboelloides* Desv.—F.T.A. 9: 83; Chev. Bot. 774. A savannah grass.
French Guinea: Futa Jallon; between Irébéléya and Timbo, 2,000-2,300 ft. (Sept.)! Guerez country (Mar.)! Sierra Leone: Port Lokko, alluvial plains (Apr.)! Robolon and Mabang (Jan.)! Sandugu! N. Nigeria: Nupe! Abinsi (July)! Ranges also from the Eastern Sudan through the Belgian Congo to Rhodesia and Angola and in Madagascar. Exsicc.—Chev. 18298; 21084. Sc. Elliot 5737. Glanville 132. Barter 1883. Dalc. 873. (See Appendix).
2. *R. triaristata* Stapf—F.T.A. 9: 85.
French Guinea: Segou (Sept.)! Timbo (Oct.)! Sierra Leone: Njala (Oct.)! Newton! Foni Flats, Brookfields (Oct.)! Gold Coast: without locality! N. Nigeria: Sokoto (Dec.)! Through the Ubangui district to E. Sudan. Exsicc.—Chev. 2329. Pobéguin 1765. Deighton 1464; 1776; 2142. Glanville 92. Beal 23. Moiset 178. (See Appendix).
3. *R. gracilis* Stapf—F.T.A. 9, 1: 86; Stapf in Hook. Ic. Pl. 3083. A slender annual, drying pinkish.
French Guinea: Kouroussa (Aug.)! Timbo (Oct.)! Exsicc.—Pobéguin 494; 1764; 1766; 1767; 1790b.
4. *R. minor* Pilger in Engl. Bot. Jahrb. 54: 280.
Sierra Leone: Freetown (Nov.). Brookfields, "Foni Flats"! Lungi, granite outcrop (Nov.)! Kitchom, moist sandy places (Jan.)! Exsicc.—Brown 71 (not seen). Deighton 933; 2159. Glanville 103.

132. HACKELOCHLOA O. Kuntze Rev. Gen. 776 (1891).

(*Manisuris* Linn. f.—F.T.A. 9: 57).

Culms erect; leaf-sheaths loose, setose with tubercle-based hairs; nodes bearded; leaf-blades linear-lanceolate, rounded and amplexicaul at the base, acute, up to 10 cm. long and about 1 cm. broad, pilose-setose and ciliate; lateral nerves 5-7 on each side; racemes 1-1.5 cm. long; glumes of sessile spikelet subequal, the lower pitted and tubercled; pedicelled spikelet as long as the sessile, ovate, herbaceous

granularis

- H. granularis** O. Kuntze. *Manisuris granularis* Swartz—F.T.A. 9: 57; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 850. *M. polytachya* Beauv. F.L. Owar. et Benin t. 14.
Throughout the area and the tropics generally. (See Appendix).

133. HEMARTHRIA R.Br.—F.T.A. 9: 54.

Culms erect or ascending from a long decumbent rooting base; leaf-sheaths ciliate towards the mouth; ligule membranous, short, ciliate; blades linear, glabrous; racemes solitary to fasciculate, pointed, 5-7 cm. long; sessile spikelet linear-oblong to oblong, 5-7 mm. long, glabrous; lower glume entire or emarginate, 2-keeled and with very narrowly winged tips, intracarinal nerves about 7; upper glume oblong-lanceolate, acute, 3-nerved; lemma of lower floret oblong, subobtus, shorter than the glumes, 2-nerved . . . *altissima*

- H. altissima** Stapf & C. E. Hubbard in Kew Bull. 1934: 109. *Rotboellia altissima* Poir. *H. fasciculata* Kunth—F.T.A. 9: 55; Chev. Rev. Bot. Appl. Agric. Trop. 1933: 850; Holl. 776. Culms up to 5 ft. high, many-noded, compressed; middle leaf-sheaths shorter than the internodes.

N. Nigeria: Kworre, 16 miles north of Sokoto, common (Sept.). Middle Niger, north of Mopti (July)! Lake Chad: Kouri Islands! Throughout Africa and the Mediterranean region, and probably introduced into America. Exsicc.—*Lean* 48. *Palmer* 32. *Chev.* 10169.

134. ROTTBOELLIA Linn. f.—F.T.A. 9: 72.

Racemes cylindric, 8–15 cm. long, the uppermost spikelets barren and forming a slender tail-like appendage to the raceme; joints of the rhachis 4–6 mm. long, rounded on the back; sessile spikelets 5–7 mm. long, ovate-lanceolate; lower glume subacute and usually bifid at the apex; normal pedicelled spikelet more compressed, with 2 male florets, the upper ones reduced and consisting of 1 glume only; leaf-sheaths usually hirsute with tubercle-based hairs, ciliate; ligules membranous, short, ciliate; leaf-blades linear-lanceolate, finely pointed, up to 2.5 cm. broad, setulose on the margin, thinly setulose with bulbous-based hairs above, glabrous below

1. *exaltata*

Racemes rather compressed, about 8 cm. long, the uppermost spikelets barren and forming a tail-like appendage to the raceme; lower glume of sessile spikelet minutely apiculate and with 2 hollows on each side of the apiculus; leaves glabrous below; other characters more or less as above 2. *purpurascens*

1. *R. exaltata* Linn. f.—F.T.A. 9, 1: 73; *Chev. Bot.* 713 and *Rev. Bot. Appl. Agric. Trop.* 1933: 852, pl. xxi; *Holl.* 776. A tall tufted grass, 5 ft. or more, with stiffly hairy leaf-sheaths, the hairs penetrating the skin on contact; leaves rather glaucous.

Senegal and French Sudan to N. and S. Nigeria, and in Fernando Po; widely distributed in tropical Africa and in the Cape Verde Islands. Exsicc.—*Chev.* 24737. *Pobéquin* 532; 1804. *Deighton* 493; 859. *Glanville* 55. *Thomas* 3805; 5691. *Beal* 20. *Howes* 903; 1204. *Dalz.* 288; 509; 870; 1315. *Maitland* 900. *Vogel* 91. (See Appendix).

2. *R. purpurascens* Robyns Fl. Agrostol. Cong. Belg. 66; Ballard in *Hook. Ic. Pl.* t. 3139. *R. compressa* Vanderyst, not of Linn. f. Tall grass 3–5 ft.; sheaths and internodes often purplish.

Sierra Leone: Bumbe, Great Scarcies (Apr.)! Bandakor, Malen R. (Sept.)! Also in Belgian Congo. Exsicc.—*Glanville* 234. *Fisher* in *Herb. Deighton* 1768.

135. ZEA Linn.—F.T.A. 9: 26.

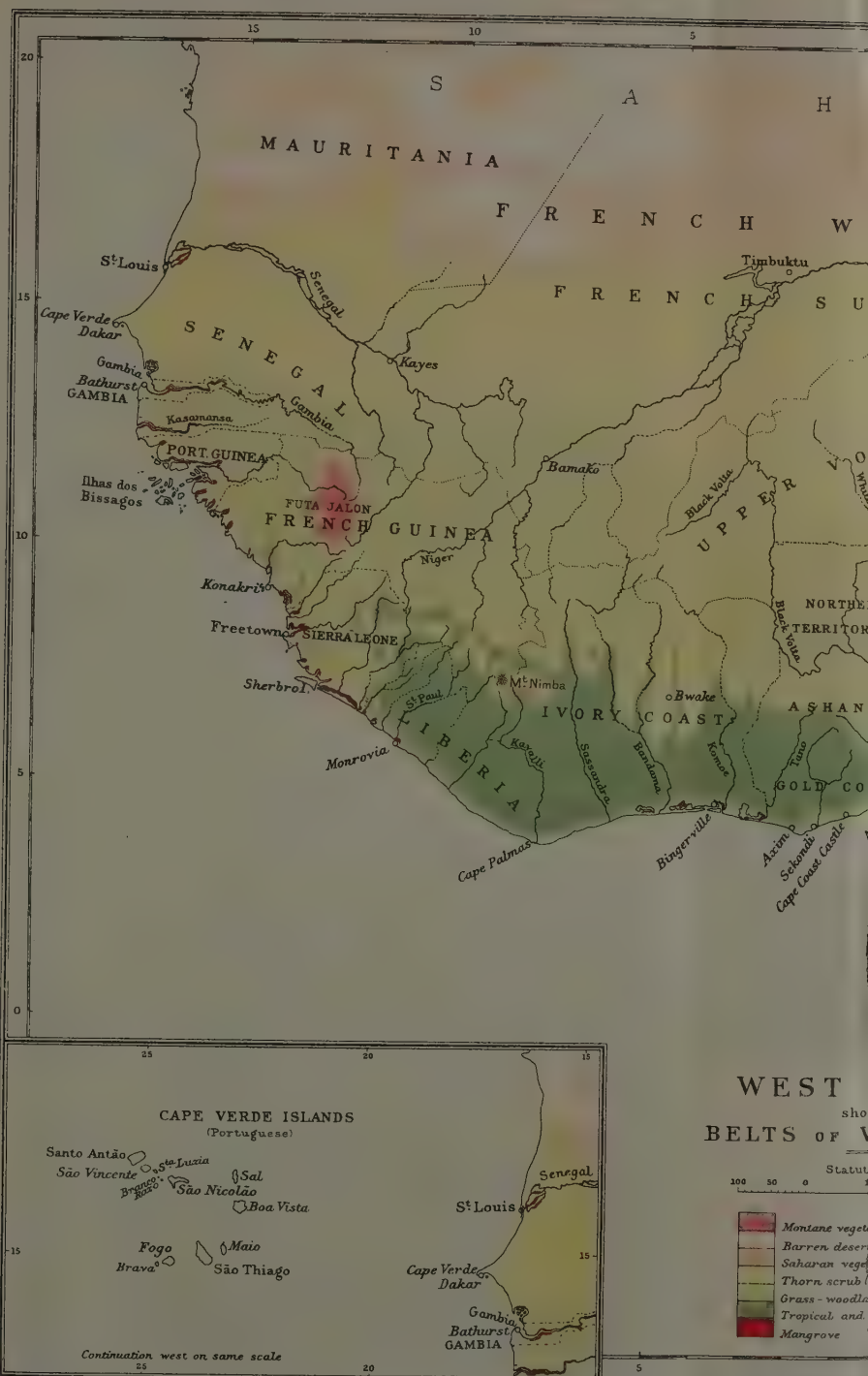
Culms up to about 15 ft. high; leaf-sheaths softly pilose towards the top near the margin; blade linear-lanceolate, up to about 1 m. long and 10 cm. broad or more; male spikelets in large terminal panicles, 2-nate on the axes, one sessile or subsessile, the other stalked; glumes shortly pubescent; stamens 3; female spikelets in axillary sheathed "cobs" varying much in size; spikelets in several longitudinal rows; grain large, subglobose or dorsally flattened *Mays*

- Z. Mays* Linn.—F.T.A. 9: 26; *Chev. Bot.* 712, and *Rev. Bot. Appl. Agric. Trop.* 1933: 848; *Holl.* 768. The Common Maize, Indian Corn, Mealies, etc., extensively cultivated. (See Appendix).

136. COIX Linn.—F.T.A. 9: 27.

Culms up to 2 m. high; leaf-sheaths glabrous; ligule short and membranous; leaf-blade lanceolate, rounded or subcordate at the base, up to 45 cm. long and 5 cm. broad, with scabrid margins; male inflorescence 2.5–5 cm. long, subtended by the false fruit, the latter an ovoid ivory-like sheath about 1 cm. long and containing the grain; male spikelets about 1.5 cm. long; glumes subequal, herbaceous, with wing-like green minutely scabrid margins *Lacryma-Jobi*

- C. Lacryma-Jobi* Linn.—F.T.A. 9: 27; *Chev. Bot.* 712, and *Rev. Bot. Appl. Agric. Trop.* 1933: 848; *Holl.* 774. The Common "Job's Tears," native of India and probably introduced into Africa. (See Appendix).



VEGETATION MAP OF WEST TROPICAL AFRICA

THE accompanying vegetation map of part of West Africa was prepared in collaboration with the late Dr. T. F. Chipp for use in this Flora and for Mr. D. A. Bannerman's *Birds of Tropical West Africa*,¹ where it is included in the first volume.

The south-eastern boundary of our Flora is marked by the dotted line from Lake Chad to Victoria in the British Mandated Cameroons. To the north it extends to the Tropic of Cancer, including a part of the Hoggar Mountains, in the Central Sahara, where considerable exploration² during the last few years has revealed the presence in that region of a Mediterranean flora. This flora is characteristic also to a large extent of the whole of the Sahara Desert, or semi-desert, which falls within our area, and is *sandy buff coloured* in the map. The *white* patches are intended to represent the completely barren areas.

The *pale yellow* colour indicates *thorn scrub savannah*, largely a grass country dotted with small spiny or prickly shrubs, annual herbs and rhizomatous under-shrubs. This type of vegetation extends right across the northern part of Africa to Egypt, Palestine, Arabia and Scinde in N.W. India, the species inhabiting it often being widely spread. In this area there is a prolonged dry season.

The *pale green* colour shows the approximate area of the *tree savannah*, in which the thorn scrub of the last-mentioned type is replaced by deciduous trees. This type of vegetation is characteristic of a great part of tropical Africa, extending through the Ubangui-Shari to the Eastern Sudan, Abyssinia, East Africa to Rhodesia, and in the Katanga region of the Belgian Congo, and the greater part of Angola. It is less arid than the scrub savannah, and is characterised by open patches of woodland or isolated trees standing over a usually dense ground cover of tall grasses and herbs with patches of forest along the rivers. The dry season is clearly differentiated, and the vegetation experiences a definite resting stage. A characteristic tree is the baobab, *Adansonia digitata*, whilst the occurrence of the genus *Protea* indicates an affinity with more remote South Africa.

More elevated regions of this and the next area, such as the Futa Jallon, in French Guinea, the Bauchi Plateau of Northern Nigeria, the Cameroons Mountain, Fernando Po, and the mountains along the Cameroons border bear a flora closely related to that of the higher plateaux and mountains of East Africa and Angola. For example, a very close affinity has been revealed between the flora of the Bauchi Plateau and that of Nyasaland. And as noted in the preface, there are many examples of species from the higher altitudes of Fernando Po, the Cameroons Mountain and the mountains along the Cameroons border being identical with those at similar altitudes in Eastern Africa, but not occurring in between. There is also a marked affinity between the flora of the upper mountain grassland of these higher altitudes and that of the North Temperate Zone. (See Mann in *Journ. Linn. Soc.* 7 : 1-13, 174-175 (1864), and J. M. Dalziel in *Scottish Geographical Mag.* 46 : 257-274 (1930)).

The river valleys often bear a flora of a different type, recruited from the tropical rain forest nearer the coast, and it is probably by means of these *gallery*

¹ Crown Agents for the Colonies, 4 Millbank, Westminster, S.W.1. Vol. I. (1930), II. (1931), III. (1933).

² R. Maire, *Études sur la Flore et la Végétation du Sahara central*, *Mém. Soc. Hist. Nat. Afr. Nord.* No. 3 (1933).

forests that the marked affinity between the ligneous flora of our area and that of Uganda and the Upper Nile may be accounted for.

The equatorial forest region, coloured *deep green*, contains a flora essentially the same as that of the great forests of the Cameroons and Congo (shown in the S.E. corner of the map) and of Uganda. This is a dense, almost impenetrable forest with giant trees forming a closed canopy. There are no marked differences in the seasons and rain may fall in all of them. The genera are mostly widely spread and extend throughout these forests, but many species are local. Recent exploration of the island of St. Thomas has shown a close affinity between its forest flora and that of the region from Liberia to the Gold Coast. From this region grasses are almost wholly excluded.

The flora of this forest region also shows marked relationship with that of Brazil and the Guianas in Eastern South America. A particularly striking example is the monocotyledonous genus *Maschalocephalus* in Liberia,¹ the only representative of *Rapateaceae* in Africa, the family otherwise being restricted to N.E. Tropical S. America. For a detailed study of the affinities of these two floras Engler's paper² should be consulted.

The mangrove vegetation, coloured *dark red*, is also more closely connected with the same formation in Eastern Tropical America than with that of East Africa or of the Eastern Tropics. For example, *Rhizophora racemosa* G. F. W. Mey., occurs from Senegal to Angola, and in Eastern Tropical America, a different species being in East Africa.

The inset map shows the relative position of the Cape Verde Islands, which are not included in the Flora.—J. H.

¹ See Hutchinson, *Families of Flowering Plants* 2: 63, with map (1934).

² See Engler in *Sitzungsber. Königl. Preuss. Akad. Wiss.*, 1905, No. vi., pp. 180-231.

LIST OF CORRECTIONS

I give below the emendations to the Flora, which have been brought to our notice either through further research on our part or on the part of those of our colleagues, who have made use of the Flora at Kew, the Natural History Museum, and the Imperial Forestry Institute, Oxford. To these we tender our best thanks. Most of these alterations are required in order to conform to the International Rules for nomenclature.

As additions to the Flora are considerable, they will be described and published in a part of the *Kew Bulletin* during 1936.—J. H.

- I : 47. R. E. Fries (in Act. Hort. Berg. 10 : 51 (1931)) has established a new genus, *Uvariodendron*, for certain non-scandent species of *Uvaria*, including numbers 1-4 of our key. The status of this genus will be discussed in the Kew Bull. l.c.
 I : 51. In description of *Anonidium Mannii* for "0.8-1.5 cm." read 8-15 cm. broad.
 I : 56. *Stenanthera* Engl. & Diels is antedated by *Stenanthera* R.Br. Exell (Journ. Bot. 1935, Suppl. 5) has proposed the new name *Neostenanthera*, and made the following combinations :—

1. *N. myrsiticifolia* Exell, l.c. 6.—*Stenanthera myrsiticifolia* Engl. & Diels.
2. *N. hamata* Exell, l.c. 6.—*Stenanthera hamata* Engl. & Diels.
3. *N. bakuana* Exell, l.c. 6.—*Stenanthera bakuana* A. Chev.

The following new species has been received since the publication of the first part of the Flora :—
Neostenanthera yalensis Hutch. & J. M. Dalz. in Kew Bull. 1936 : ined.

Tree up to 25 m. high ; trunk 30 cm. diam. ; branchlets rusty-tomentose ; leaves oblong-oblanccolate, long-acuminate, narrowed to an obtuse base, 7-14 cm. long, 3.5-5 cm. broad, softly rusty-pubescent below ; lateral nerves 8-10 ; flowers solitary ; pedicels 3-4 cm. long, much thickened below the flower ; outer petals 4.5 cm. long ; fruits long-stipitate, ellipsoid, 2 cm. long, rusty-tomentellous ; stipe about 5 cm.

Liberia : Dukwia River (Apr.) ! Ivory Coast : Sanvi, Aboisso (Apr.) ! Gold Coast : Ankasa Forest Reserve (Dec.) ! Axim (fr. Feb.) ! Exsicc.—Cooper 371 (type). Chev. 16306, Vigne 3163, Irvine 2235. Closely allied to *N. hamata*, but outer petals shorter and fruits much more long-stipitate.

- I : 63. *Illigera pentaphylla* Welw. is rendered invalid by *I. vespertilio* B. f. in Journ. Bot. 1925 : 175, founded on *Dioscorea vespertilio* Benth. (see Vol. II : 382).

- I : 87. To *Euadenia trifoliolata* Oliv. add syn. *Pteropetalum Klingii* Pax.

- I : 101. *Polygala obtusata* DC. The name to be used for this should be *P. irregularis* Boiss., which is quoted as a synonym, our species not being *P. obtusata* DC. Mr. Exell informs me that his *P. Hagerupii* should also be included.

- I : 106. The well-known name *Vahlia viscosa* Roxb. should give place to *V. digyna* O. Ktze. Rev. Gen. Pl. 1 : 227 (1891), based on *Oldenlandia digyna* Retz (1786).

- I : 120. An earlier name for *Polygonum serrulatum* Lag. is *P. salicifolium* Brouss. ex Willd. Enum. Hort. Berol. 428 (1809).

- I : 146. *Jussiaea villosa* Lam. should be called *J. suffruticosa* Linn. (1753).

- I : 173. The authority for *Adenia tenuispira* should be Engl. Pflanzenwelt Afrikas 3, 2 : 603 (1921).

- I : 202. *Petersia* Welw. is antedated by *Petersia* Klotzsch, and should now be called *Combretodendron* A. Chev. as follows :—

Combretodendron africanum Exell in Journ. Bot. 1930 : 182. *Petersia africana* Welw. *P. viridiflora* A. Chev. *Petersianthus africanus* Merr. *Combretodendron viridiflora* A. Chev.

- I : 220. The name *Combretum velutinum* Engl. & Diels is invalid because of the earlier *C. velutinum* DC. Exell, in Journ. Bot. 1929 : 179, proposes the name *C. Mooreanum* Exell in its place.

- I : 221. According to Exell, l.c. 103, *C. Mildbraedii* Hutch. & J. M. Dalz. is the same as *C. Demeusei* De Wild. from the Belgian Congo. The latter name is older and should therefore be used if they are identical.

- I : 221. Exell, l.c. 140, has found that the type specimen of *Combretum Kerstingii* Engl. & Diels (*Kersting* 615) is different from those seen by us and referred to *C. hasalense* Engl. & Diels, and is a distinct species allied to *C. lamprocarpum* Diels.

It is also important to note that Mr. Exell considers we are "undoubtedly correct in regarding *C. obanense* Hutch. & J. M. Dalz. as a distinct species rather than a variety of *C. paucinerium* Engl. & Diels."

- I : 227. To *Rhizophoraceae* add genus *Poga* : *P. oleosa* Pierre in Bull. Soc. Linn. Paris 1896 : 1254 ; Holl. 2 : 305.

A tree about 20 m. high ; branches glabrous, purplish ; leaves elliptic, rounded and oblique at the apex, rounded at the base, 12-15 cm. long, 6-7 cm. broad, leathery, loosely gland-dotted below ; lateral nerves numerous ; petiole flat above, 2 cm. long ; flowers very small, arranged in panicles of catkin-like spikes on leafless shoots ; axis becoming woolly ; sepals and petals 4 ; stamens 8 ; ovary inferior, 4-celled ; ovules solitary, pendulous ; fruit a large drupe, ellipsoid, about 6 cm. long, with fleshy exocarp and woody endocarp, with numerous resinous lacunae ; seeds without endosperm.

S. Nigeria : Oban ! Also in Cameroons and Gabon. Exsicc.—Talb. 1636. (See Appendix).

- I: 232. The name *Haronga* Dupet.-Thouars (1806), should be given up in favour of the earlier *Harungana* Lam. (1797). This should now be as follows (cf. Exell in Journ. Bot. 1930: 181):—
Harungana madagascariensis Lam. *Arungana paniculata* Pers. *Haronga madagascariensis* Choisy. *Haronga paniculata* Lodd.
- I: 241. The name *Honckenia* Willd. (1793) should be replaced by *Clappertonia* Meisn. (1837), because of the earlier *Honckenia* Ehrh. (1788), a caryophyllaceous genus often now recognised as distinct (see Becherer in Fedde Rep. 28: 58 (1930)).
 The names should therefore now read as follows:—
 1. *Clappertonia ficifolia* Decne in Deless. Ic. Sel. Pl. 5: 1, t. 1 (1846). *Honckenia ficifolia* Willd.
 2. *C. minor* Becherer l.c. *Honckenia minor* Baill. *H. parva* K. Schum.
- I: 248. The correct name for *Dombeya reticulata* Mast. is *D. quinqueseta* Ezell in Journ. Bot. 263 (1935), based on *Xeropetalum quinqueseta* Del. (1826).
- I: 251. The name *Sterculia tomentosa* Guill. & Perr. (1831) is invalid because of *S. tomentosa* Thunb. (1802). The correct name is *S. setigera* Del. Cent. Pl. Afr. 61 (1826).
- I: 251. *Firmiana* Marsigli. H. N. Ridley in Kew Bull. 1934: 214, has shown that the genus *Firmiana* was founded on an Asiatic species, *F. platanifolia* Marsigli, and that certain other species since referred to the genus are generically distinct and should be transferred to the genus *Erythropsis* Lindl. With this view I am entirely in agreement, and therefore *Firmiana Barteri* K. Schum. (*Sterculia Barteri* Mast.) should now be called *Erythropsis Barteri* Ridley.
- I: 256. To No. 24 add syn. *Cola mirabilis* A. Chev.
- I: 258. **Bombax**: since writing this part of the Flora I have seen *B. Andrieuxi* B. costatum, and *B. Howardii* Pellegr. & Vuillet in Lecomte, Not. Syst 3: 88-90 (1914), and I consider them all to be *B. buonopozense* P. Beauv. to which they should be added as synonyms.
- I: 270. **Kosteletzkya**: *K. Buettneri* Gürke (1889) is older than *K. flava* Bak. f. (1894), and should be used.
K. Chevalieri Hochr.—In adopting this name for the species we followed the practice of many botanists at that time of regarding Garcke's combination as having been imperfectly made because of his wrong determination of Schimper's No. 1480 as the *Hibiscus Grantii* Mast. As he made the new combination, *K. Grantii* Garcke, however, this name should be used in place of *K. Chevalieri*.
- I: 282. To **Spondianthus Preussii** Engl. add the following Exsiccatae: Maitland 789. Mildbr. 10587. Preuss 426. Winkler 521.
- I: 306 at foot. For "*M. communis*" read *R. communis*.
- I: 316. It should be noted that the original spelling of *Parinarium* Juss. was *Parinari* Aubl., and that the adoption of the latter renders the specific names feminine.
- I: 317. From No. 3, *Parinarium glabrum* Olive., remove from the Exsicc. Chipp 299 and transfer it to *Afrolicania elaeosperma* Mildbr.
- I: 331. **Hymenostegia**. To this should be added *Hymenostegia emarginata* Milne-Redhead, MS. (*Monopetalanthus emarginatus* Hutch. & J. M. Dalz.). The acquisition of a good flowering specimen from Deighton, No. 1950, from Njala, Sierra Leone, shows this to be a *Hymenostegia*. For the Flora we had only a young fruiting example. Mr. Deighton describes it as a tree 80 ft. high, with blunt corky spines or warts 1 cm. long on the lower part of the trunk; young shoots with pale leaves tinged with pink; flowers white; racemes 3-4-flowered; pedicels rusty-pubescent; bracts coloured, ovate-acuminate, 1 cm. long.
- I: 335. An older name for *Cassia goratensis* Fresen. (1839) is *C. singueana* Del. (1826), and for *Cassia obovata* Collad (1816) *C. Aschrek* Forssk. (1775).
- I: 338. **Copaifera**: An older name for *C. Guibourtiana* Benth. is *C. copallifera* Milne-Redhead, based on *Guibourtia copallifera* Benn. (1857). See Milne-Redhead in Kew Bull. 1934: 400.
- I: 350. **Erythrophleum**: An older name for *E. micranthum* Harms (1911) is *E. ivorense* A. Chev. Veg. Ut. Afr. Trop. Fr. 5: 178 (1909).
- I: 357. The authority for *Dichrostachys glomerata* should be Chiov. in Ann. dl Bot. 13: 409 (1915).
- I: 363. For *Albizzia sassa* Macbride substitute the older name *A. gummifera* C. A. Smith in Kew Bull. 1930: 218 (*Sassa gummifera* Gmel.).
- I: 378. *Ostryocarpus Welwitschii* Baker has been transferred by Bak. f. to *Dalbergiella*, *D. Welwitschii* Bak. f. in Journ. Bot. 1928, Suppl. 128, fig. A-J.

- I : 383. The oldest name for *Mundulea suberosa* Benth. is *M. sericea* Greenway in Kew Bull. 1936: ined. based on *Cytisus sericeus* Willd.
- I : 387. *Astragalus Vogelii*: the authority for this should be Bornmüller in Beih. Bot. Centralblatt, 33: 233 (1915).
- I : 402. *Eriosema*: According to Bak. f., Legum. Trop. Afr. 508, the name *Eriosema psoraleoides* Don Gen. Syst. 2: 348 (*Crotalaria psoraleoides* Lam. (1786)), should be used for No. 3, *E. cajanoides* Hook. f.
- I : 413. Our *Zornia Lelyi* should give place to *Z. durumensis* De Wild. in Rev. Zool. Afr. 13, Suppl. Bot. B.16 (1925), with which it is identical (J. E. Dandy).
- I : 418. *Desmodium paleaceum* Guill. & Perr. should be called *D. salicifolium* DC. based on *Hedysarum salicifolium* Poir.
- I : 419. *Alysicarpus violaceus* Schindl. cannot be maintained, being based on *Hedysarum violaceum* Forsk. not of Linn. Correct name *A. glumaceus* DC. (*Hedysarum glumaceum* Vahl).
- I : 435. *Bosqueia* should read **Bosqueia**.
- I : 449. *Hippocratea Thomasii* Hutch. & M. B. Moss is *Secamone myrtifolia* Benth. (q.v.) to which it should be added as a synonym.
- I : 458. To synonymy of *Heisteria parvifolia* Smith add *Phanerocalyx Talbotiorum* S. Moore in Journ. Bot. 1921: 244.

99A. AQUIFOLIACEAE

Ilex Linn.—F.T.A. 1: 359.

- I. *mitis* Radlk. in Rep. Brit. Assoc. Aberd. (1885), and in Engl. Bot. Jahrb. 17: 540.
I. *capensis* Sond. & Harv.—F.T.A. 1: 359.

Tree up to 13 m. high; branches glabrous; leaves oblong, apiculate, obtuse to subacute at the base, up to 10 cm. long and 4 cm. broad, entire or remotely denticulate, glabrous, with numerous spreading looped lateral nerves; petiole 1 cm. long; flowers subfasciculate on short axillary peduncles; pedicels up to 1 cm. long; sepals minutely ciliate; petals shortly connate; stigma thick and sessile; fruit subglobose, 5 mm. diam., girt by the persistent sepals.

Cameroons Mt.: 4,500–7,500 ft., in forest undergrowth (Dec.–Feb.)! Also in E. and S. Africa. Exsicc.—Mann 1186. Maitland 212; 237; 983; 1660.

- I : 470. *Zizyphus* Juss. should read *Ziziphus* Mill. (1754) and *Zizyphus jujuba* Lam. (1789), not of Mill. (1768), should be called *Z. mauritiana* Lam. Encycl. Méth. Bot. 3: 319 (1789).
- I : 475. For *Cissus quadrangularis* Linn. read *C. quadrangulus* Linn.
- I : 519. *Alanguin begoniifolium* Baill.—In using this name we followed the monographer, W. Wangerin in Engler's Pflanzenreich. According to Rehder (Pl. Wilson. 2: 552), if there be only one species involved, which is very doubtful, the oldest name is *A. chinense* Rehd. It should be noted, however, that Wangerin included the original of this (*Stylidium chinense* Lour.) with doubt in the synonymy. The African plants may be distinct from the Asiatic and require a different name. This problem will be dealt with in the Kew Bulletin.
- I : 523. C. Norman in Journ. Linn. Soc. Bot. 49: 514 has restored *Steganotaenia* Hochst. and transferred to it *Peucedanum araliaceum* Benth. & Hook. f. and *P. fraziniifolium* Hiern, uniting these two species under *Steganotaenia araliacea* Hochst.
- II : 28. The genus *Farquharia* Stapf to be added to family **Apocynaceae** :—
Farquharia Stapf in Kew Bull. 1912: 278. Habit of *Isonema*, but the corolla-lobes symmetrical and the stamens inserted in the middle of and included in the corolla-tube.
F. elliptica Stapf l.c.
Branchlets terete; internodes about 5 cm. long; leaves elliptic or oblong-elliptic, obliquely and obtusely acuminate, rounded to a subacute base, 7–9 cm. long, 3.5–5 cm. broad, glabrous; lateral nerves about 4, spreading; cymes terminal, finely puberulous all over; calyx-lobes rounded ovate; corolla 3 cm. long, lobes 1 cm. long, puberulous; anthers 5 mm. long; style 9 mm. long.
S. Nigeria: Benin Distr.; Mogumu (Mar.)! Exsicc.—Farquhar 8.
- II : 54. To *Secamone myrtifolia* Benth. add as synonym *Hippocratea Thomasii* Hutch. & M. B. Moss.
- II : 85. The authority for *Cremaspora triflora* should be K. Schum. in Engl. & Prantl, Naturf. Pflanzenfam. 4, 4: 88 (1891).
- II : 87. As there was already an *Izora congesta* Roxb. Fl. Ind. 1: 387 (1824), *I. congesta* Stapf requires a new name as follows: *I. aggregata* Hutch., nom. nov.
- II : 89. *Pavetta*. A revision by Bremekamp in Fedde Repert. vol. 37 (1934) should be consulted for changes. These will be considered in the Kew Bulletin so far as our Flora is concerned.
- II : 98. *Mitragnya* Korth.—Remove from the synonymy the name *Sarcocephalus Pobeguini* Hua and transfer it and the following record to **Sarcocephalus Diderrichii** De Wild. :—Chev. 17235; B.22302.

- II : 99. *Sarcocephalus* Afz.—Exclude the following record :—*Cooper* 279 and transfer it to *Sarcocephalus Diderrichii De Wild.* This species is to be added to the Flora. It may be distinguished from *Mitragyne stipulosa* by the solitary (not paniculate) heads, and from *Sarcocephalus esculentus* Afz. by the stipules, which are deciduous (except at the end of the shoot), large, oblong-elliptic and sharply winged-keeled towards the base.
S. Diderrichii De Wild. in Masui État. Indép. Congo Expos. Brux. 1897 : 439 (syns. *S. Trillesii* Pierre, *via edit.* and *S. Pobeguini* Pobéguin) is a large tree of the evergreen forest, distributed as follows :—
 French Guinea : Kouroussa ! Liberia : Dukwia R. (fr. Feb.) ! Ivory Coast : Alépé ! Azaguié (fr. Sept.) ! Gold Coast : near Kankan (June) ! S. Nigeria : Ahoada Distr. ! Likomba (Nov.) ! Ondo ! Extends to the Gabon. Exsicc.—*Cooper* 279. *Chev.* 15172 ; 16235 ; 16301 ; 17235 : B.22302. *Thompson* 89. *Cooper* 279. *King-Church* 41. *Mildbr.* 10605. *Thornevill* 226 ; 255 ; 256 ; 257. *Pobéguin* 433.
- II : 101. As the name *Mussaenda uniflora* Wall. ex G. Don (1832) was already used, our *M. uniflora* requires a new name as follows : *Mussaenda Colleenetii Hutch.*
- II : 132. The authority for *Neobaumannia hedyotoidea* should be *Hutch. & J. M. Dalz.*
- II : 136. The correct spelling is *Mitracarpus* Zucc., not *Mitracarpum* of authors. The correct name of the species is *M. scaber* Zucc.
- II : 143. *Chrysanthellum procumbens* Pers. (1807) should give place to *C. americanum* Vathek (1835), based on *Anthemis americana* Linn. (1753).
- II : 148. As there is a *Gynura caerulea* O. Hoffm., our name should be changed to *G. bauchiensis* Hutch., nom. nov.
- II : 148. After No. 4 add *G. Tedliei* S. Moore, MS. (*Senecio Tedliei* Oliv. & Hiern—F.T.A. 3 : 420). Scandent ; leaves ovate, repand-angular, 5 cm. long, 4 cm. broad ; petiole up to 1.5 cm. long ; heads nearly 1 cm. long, discoid, on slender short pubescent peduncles, in dense lateral and terminal cymes ; calyculi very small ; involucre bracts about 12, as long as the flowers ; achenes glabrous, black when dry.
 Gold Coast : Ashanti ! Exsicc.—*Tedlie*.
- II : 157. *Vicoa auriculata* Cass. should be called *V. indica* DC. (1834), based on *Inula indica* Linn. (1763).
- II : 168. *Vernonia conyzoides* Hutch. & J. M. Dalz. is invalid because of *V. conyzoides* DC. To be renamed *V. Thomasi* Hutch., nom. nov.
- II : 196. An older name for *Cordia Heudelotii* Baker is *C. senegalensis* A. Juss. in Lam. Encycl. 7 : 46 (1806).—See Pellegrin in Bull. Soc. Bot. Fr. 81 : 270 (1934).
- II : 201. Because *Anchusa asperima* Del. proves to be a *nomen nudum*, *Arnebia hispidissima* DC. should stand as the name for this species.
- II : 248. The older name for *Whitfieldia longifolia* T. Anders. when combined with *W. elongata* C.B.Cl. is the latter, based on *Ruellia elongata* Beauv.
- II : 253. The name *Physacanthus batanganus* Rendle & Britt. in Journ. Bot. 47 : 378 (1909) should be used for *Physacanthus inflatus* C.B.Cl.
- II : 257. The name *Afrofitonia silvestris* Lindau in Engl. Bot. Jahrb. 49 : 406 (Mar. 1913) takes precedence over *Talbotia radicans* S. Moore in Cat. Talb. Nlg. Pl. 80, t. 11, figs. 1-6 (Apr. 1913).
- II : 247. *Hygrophila Teuzii* Lindau is a synonym of *H. uliginosa* S. Moore in Journ. Bot. 197 (1880).
- II : 261. An older name for *Nelsonia campestris* R.Br. is *N. canescens* Spreng. Syst. 1 : 42 (1825), based on *Justicia canescens* Lam. (1791).
- II : 262. In using the generic name *Eranthemum*, we followed C. B. Clarke in the Flora of Tropical Africa. This has been shown by Stapf (sub Bot. Mag. t. 8239) to be erroneous and the name to be used should be *Pseuderanthemum*, the names for our species being as follows :—
 1. *Pseuderanthemum nirgitianum* Radlk. in Sitz.-Ber. Bayr. Akad. 13 : 286.
 2. *P. Ludovicianum* Lindau in Engl. & Prantl, Nat. Pflanzenfam, 4, 3B : 330.
 3. *P. hypocrateriforme* Radlk. l.c.
- II : 276. *Vitex Cienkowski* Kotschy & Peyr. (1867) should give place to *V. cuneata* Thonn. in Schum. & Thonn. Beskr. Fl. Guin. 289 (1829).
- II : 286. *Moschosma* Reichb. should be called *Basilicum* Moench (1802). *Moschosma polystachyum* Benth. should therefore be *Basilicum polystachyon* Moench. Suppl. Meth. Pl. 143 (1802), based on *Ocimum polystachyon* Linn.

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